REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association.
Contents are listed in the Education Index.

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Vol. XXX, No. 1 February 1960

The Educational Program: Adolescence

Reviews the literature for the six-year period since the issuance of Vol. XXIV, No. 1, February 1954

TABLE OF CONTENTS

Chapter *Page*

Introduction 4

I. The Adolescent: His Society 5
ROBERT D. HESS, *University of Chicago, Chicago, Illinois*

II. The Adolescent: His Characteristics and Development 13
JACOB T. HUNT, *University of Arizona, Tucson, Arizona*

III. The School Program: Aims of Secondary Education 23
VICTOR B. LAWHEAD, *Ball State Teachers College, Muncie, Indiana*

IV. The School Program: Curriculum Content and Organization 34
CHARLES B. MENDENHALL, HUGH D. LAUGHLIN, and
EARL W. HARMER, *The Ohio State University, Columbus, Ohio*

V. The School Program: General Instructional Procedures 49
JOSEPH R. ELLIS, *Indiana State Teachers College, Terre Haute, Indiana*

VI. The School Program: Nonclass Experience 57
MAURICE J. EASH, *Ball State Teachers College, Muncie, Indiana*

Chapter *Page*

VII. The School Program: Organization and Staff 67
GLENN R. SNIDER, *University of Oklahoma, Norman, Oklahoma*

VIII. Needed Research 86
HENRY R. ANGELINO, *University of Oklahoma, Norman, Oklahoma*

Index 89

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INTRODUCTION

THIS issue of the REVIEW follows much the same organization as its February 1954 predecessor, except that the number of chapters has been reduced to eight to achieve better continuity and less duplication. No area has been slighted because of this reduction.

The field has shown considerable activity in the last six years, but, as indicated by the lengths of the various chapters, publication development in its various areas has been uneven. Further, research has been without the quality that is ideally desirable. As noted in the chapter on needed research, for substantial benefit it is necessary that we isolate pertinent areas and follow through with, if possible, ingenious, but in any case, carefully planned, research designs. Changing issues and times require changing emphases, but there remains always the necessity of careful design and thorough execution of research. Only in this way will we gain the knowledge so urgently needed.

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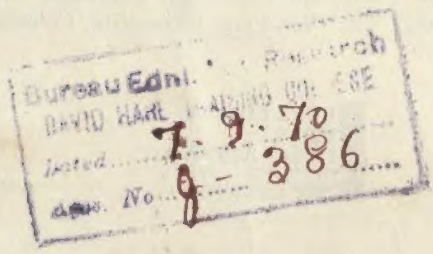

CHAPTER I

The Adolescent: His Society

ROBERT D. HESS

ONE OF the minor conceptual controversies in the study of adolescents is the question of whether patterns of adolescent social interaction and values should be regarded as constituting a subculture or merely as behavioral phenomena characteristic of a particular phase of personal development.

Adolescence: Subculture or Developmental Phase

Though hardly admissible as educational research, some recent articles and books are relevant: Salisbury's *The Shook-up Generation* (40), a *New Yorker* Profile of Eugene Gilbert (34), and an article in *Consumer Reports* (13).

Elkin and Westley (15) challenged the assumption that there is a youth culture that is widespread and dominant among teen-agers. Their interview of 40 adolescents living in a well-to-do suburb of Montreal led them to conclude that teen-agers are not compulsively independent and rejecting of adult values; that there is more continuity than discontinuity in their socialization; and that, though youth-culture elements exist, they are less dominant than are accepted family and authority guidance patterns.

Rose (39) studied four rural high schools in different areas of Minnesota by questionnaires about the importance of different membership reference groups. The most frequently mentioned, and presumably the most significant, was the family. There was little discrepancy between the youths' values and what they perceived their parents' values to be. Boyer's research (7) supported the view that parents are teen-agers' most influential reference group.

However, the hierarchical order of the reference groups to which the teen-ager responds is not established. Forer (18), studying the impact of radio on adolescents, utilized a continuing panel discussion program of adolescents' problems by adolescents, which was broadcast in Connecticut and nationally between 1948 and 1952. In 1952, 2700 students of high-school age in six Connecticut communities filled out questionnaires designed to answer two questions: (a) the relative acceptability of advice from the panel and advice from the respondent's primary reference group and (b) the effectiveness of the program as a socializing agent. Of those who listened to the program, 82 percent said the advice was "usually very good," and 69 percent said they would "follow the advice given." Fifteen

percent said they would follow the advice given on the program before that of their fathers, and 10.5 percent before that of their mothers. Over half of the group would follow advice given on the program before that given in a book, magazine, or advice column in a newspaper, and 49 percent would follow it before the advice of teen-age friends.

It seems likely that the tendency to turn to a specific reference group is influenced by the nature of the advice or counsel sought. Carlson and Sullenger (9) sought to discover the areas in which teen-agers desire counseling and learned that the desire for, and perhaps the acceptability of, counseling varies not only with age but from topic to topic.

Neiman's investigation (33) of the influence of peer groups upon attitudes toward the feminine role emphasized the diminishing importance of family norms and the increasing significance of the impact of peer-group norms upon attitudes. However, Angelino's research (1) indicated a high degree of correspondence between mothers and daughters in attitudes toward clothing and grooming. The differential in responsiveness of teen-agers to different reference groups may become an increasingly useful line of research on adolescent socialization.

Perception of Adult Society

Whether or not we have a youth culture, the perceptions that adolescents have of adult society and of their own position in relation to it may influence their immediate behavior and their later participation in adult roles. Hess and Goldblatt (22) touched on this point in a study of adolescents and their parents. The teen-age and parent groups both evaluated teen-agers in similar fashion on a rating scale, but each group misjudged the attitudes of the other. Adolescents expected that parents would undervalue and depreciate them; parents expected that teen-agers would overestimate their own maturity.

That adolescents have an unrealistic view of specific adult roles was indicated by Hobart (23), who examined attitudes toward marital patterns of behavior. Attitudes toward legal authorities were examined by Chapman (10), who found no difference in this respect between delinquent and nondelinquent boys. Crane's study (14) of stereotypes of adults held by early adolescents (Three hundred and fifty-eight Australian pupils between the ages of 12 and 15 were asked to write about "the sort of person I would like to be when I grow up.") showed a shift from fantasy toward reality for both girls and boys aged 13 and 14.

The views of gifted and average adolescents toward several aspects of growing up were studied by Strang (43), who found both similarities and differences. A study by Payne (37) on attitudes toward whether or not wives should work after marriage revealed disagreement between adolescent boys and girls. Boys (78 percent) were opposed to wives' working; girls (92 percent) indicated that they expected to work after marriage.

The problem of marriage during high school was investigated by Landis (26) from the point of view of the attitudes of high-school principals. Responses to a questionnaire revealed that schools generally have not defined their position on student marriage, although most principals reported at least one student marriage during the preceding year. Some of the uncertainties about adolescent roles and behaviors appeared to be shared by adults.

A broader inquiry into the factors associated with early marriage was undertaken by Moss and Gingles (32) in their study of the relationship between personality and early marriage. Their hypothesis that girls who marry early are less well adjusted than those who marry later was not supported by data obtained from the *Mooney Problem Check List.* However, data from the *Minnesota Multiphasic Personality Inventory* supported that hypothesis and also the hypothesis that girls who marry early tend to have had less satisfying family relationships than their schoolmates. From these data and interviews two types of girls show an orientation toward early marriage: (a) those emotionally insecure, who wish to escape an unhappy environment; and (b) those maturing early, whose aspiration level and expectation of marital happiness are comparatively low.

However, in an investigation of role deprivation and age at marriage, Burchinal (8) found no significant association between age at marriage and either personality characteristics of girls or their relationship with parents. A study by Fleck and others (17) on pregnancy as a symptom of adolescent maladjustment may be related to this question. Fleck's sample was 100 unmarried pregnant girls in Seattle. He concluded that pregnancy is often symptomatic, brought about almost consciously as a neurotic solution during adolescence, and that these girls had background problems which would have been a factor in adjustment even without pregnancy. The degree to which the adolescent selects and structures his social world to serve his psychological needs remains an open question.

Family Relationships

The changing lines of relationship between adolescents and their families continued to attract attention. Liccione's investigation (27) of changing family relationships of adolescent girls advanced three hypotheses: (a) The mother-daughter relationship holds more conflict than the father-daughter relationship. (b) The peak of tension and disequilibrium between mother and daughter occurs at puberty or shortly thereafter. (c) The least tension or disequilibrium between father and daughter occurs at puberty.

Administering *Thematic Apperception Test* cards to 50 girls at each of five age levels, 9, 11, 13, 15, and 17, Liccione found parent-child "disequilibrium themes" to outnumber "equilibrium themes" about 5 to 1. Significantly greater interaction (both harmony and disharmony) in

mother-daughter than in father-daughter relationships was noted at all five age levels. The proportion of equilibrium and disequilibrium themes was approximately equal for both father- and mother-child relationships.

Research on parent-adolescent relationships by Connor, Johannis, and Walters (12) examined change in conflicts during the high-school period and related this change to family backgrounds. Using a questionnaire with 119 women college students, Connor found conflict highest in the area of dating and mate selection. Family characteristics were not generally associated with type and number of expressed parent-adolescent conflicts. Nye (35) studied family effect upon delinquent behavior.

Relation to Community

The declining interaction between adolescent and family suggests research on the teen-ager's increasing interaction with individuals, cliques, and institutions outside the home. The Youth Community Participation Project (19, 20, 36) approached this area of investigation with a conception of three persistent needs of the youth: (a) to feel that there is a significant place for him in his immediate social world, (b) to exercise his intelligence and growing maturity in solving problems of real concern to him and to the adult world, and (c) to learn that his own life situation is not the only one there is. The studies, centered in several community settings, evolved several postulates regarding community influences on the formation of youth groups: (a) Civically oriented self-governing groups probably cannot develop or survive without active community help and localized institutional support. (b) The broad American culture predisposes groups toward prescribed organizational forms, group procedures, and group goals. (c) Many adolescents perceive adolescents to be judged by the community as bad unless proven good.

Cohen's analysis (11) of the delinquent subculture was of particular interest to readers concerned with community and social-class influences upon group formation and behavior. An attempt to apply theory and knowledge through community resources toward preventing delinquency and to develop special talents in children and adolescents was made by the Quincy Youth Development Project (5, 6, 21, 28). An earlier attempt to change behavior of lower-class boys by the influence of a friendly, understanding adult was re-examined and evaluated by McCord, McCord, and Zola (30). They looked for latent positive effects of a program which, although it apparently failed at the time, might have an effect upon the boys of the experimental group 20 years later. No such effects were detected.

Peer Groups

Although the adolescent touches the institutions of the community at several points, he relates to most institutions (in some instances, including

the school) as a member of a social clique, club, or gang. Information on group membership and the relationship of voluntary associations to other activities of teen-agers was presented in two reports on national surveys, one for the Girl Scouts and one for the Boy Scouts, conducted by the Survey Research Center of the University of Michigan. For a reader interested in estimates of national norms, both are useful. A survey on a local level reported by Boyer (7) provided information on a number of topics touched in this review.

An intensive study by Phelps and Horrocks (38) of factors influencing informal groups of adolescents concluded that: (a) Although socioeconomic status is significantly related to many areas of adolescent informal group activities, it is not the dominant factor. (b) Girls are influenced to a greater degree in informal group activities than boys. (c) Emancipation from adult control is an important influence in the formation of patterns of informal group activities. (d) The school tends to reinforce upper socioeconomic values and is used to satisfy social needs by young people of upper socioeconomic status more than by those of lower status.

Although the tendency for adolescents to form friendship cliques and larger social groupings is evident, the nature of the processes which lead to the emergence of these social units is still unclear and offers a fruitful area for research. Scandrette (41) approached this problem from the standpoint of the relationship between social distance and degree of acquaintance. Utilizing a social-distance scale based on friendship preferences and an acquaintanceship scale, he concluded that degree of acquaintance is significantly related to frequency of choice as a desired friend. Although "undesirable personality traits" may reverse this association, the more general trend has practical implications for group and social club membership and group acceptance.

The significance of sociempathy for status in a group was studied by Ausubel (2), who reported that persons of like sociometric status do not necessarily perceive one another more accurately than those of different status. Jones (24) examined the differences between high-school students who received public recognition in high school and those who received none. The groups did not differ in intelligence, socioeconomic status, or positiveness of self-concept, and the "no-mention" group was not a collection of persons with undesirable traits. A related study by Marks (31) investigated characteristics of high-school students with high or low status in the peer group.

Keislar's investigation (25) indicated that in "Y" clubs, to which admission was by invitation of the group, grade-point average differentiated among groups more than did intelligence. Occupation of father was not a differentiating variable. Warnath (44), examining the relationship between family experience and peer acceptance, saw evidence to support the hypothesis that the ability to make positive impressions on one's peers is associated with family experience.

The degree to which socioeconomic background influences behavior of the adolescent remained a topic of theoretical and research concern. Maas (29), studying the effects of social class upon participation of members of neighborhood clubs, found a socioeconomic differential in the relationship between the club membership and the adult leader, and also among members. Sewell, Haller, and Straus (42) examined social-class influences on teen-age behavior and on occupational and educational aspirations and goals, using a one-sixth random sample of all nonfarm seniors in private and public high schools in Wisconsin in 1947-48. Their study disclosed significant association, for both males and females, between social status and level of occupational and educational aspiration when the factor of intelligence is controlled.

Empey (16) hypothesized that seniors from lower social strata were more inclined than those from middle and upper strata to reduce their occupational aspirations when faced with the necessity of choosing between their preferred and anticipated occupations, but his study revealed no support for this hypothesis.

Summary

The society of the teen-ager is generally regarded as isolated, or at least apart, from the broader society which it touches at several points. Although the adolescent peer group is affected by these contact points—the home, the school, the community, and its other institutions—it is not an integrated part of the society. Barker and Wright's description (3) of the psychological ecology of a small community contained a detailed account of the adolescent and his community relationship.

To the degree to which this youth culture operates as a subsystem of the society (as illustrated by making some of its own rules, creating a status system, exercising its own sanctions), it is a potential socializing influence that may be in conflict on significant points with the adult society. There is considerable reason to believe that the importance and self-sufficiency of teen-age society will increase, not only in the United States, but also in several other countries as well (4). This trend will have practical implications and theoretical significance and invites carefully planned research of major scope.

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CHAPTER II

The Adolescent: His Characteristics and Development

JACOB T. HUNT

THE CONTINUING rapid growth of the literature on the adolescent has necessitated a rigorous and, at times, arbitrary selection of studies to be reviewed. Nonresearch articles, marginal studies, and those related to topics covered recently by other numbers of the REVIEW (for example, "Exceptional Children and Youth," December 1959) have been omitted.

New or revised textbooks have appeared by Bernard (10), Cole and Hall (14), Crow and Crow (19), Garrison (29), Gesell, Ilg, and Ames (30), Hurlock (43), Jersild (44), Stone and Church (80), and Wattenberg (91). Important works based mostly upon self-reports of adolescents were written by Edelston (23), Gallagher and Harris (28), Remmers and Radler (67), and Strang (81).

Physical Development

An excellent digest and appraisal of growth studies appearing during the five-year period 1950-55 was made by Krogman (50). The data from the 222 references, almost all of which reflected the cross-sectional approach, were organized around the main topics of height-weight studies, general bodily growth, body build and composition, bone growth and ossification, circumpubertal growth, and the role of diet and other physiological factors.

Utilizing data obtained from the measurement of 6535 boys and girls from four Texas cities, Whitacre and Grimes (93) reported that means of the 11 measures made at one time on each subject showed, for all ages combined, and for each year of age separately, that the children from the two southern cities were larger on every measurement than those from the two northern cities. Since several expected influences (for example, differences in food consumption and in socioeconomic level) were seemingly ruled out, the authors proposed that climatic variations between the two cities be considered as possible reasons for the growth differences.

Data from the California Adolescent Growth Study revealed marked individual and intra-individual differences in gross physical growth (8, 88) and in physiological development and changes (24, 57). McKee and Eichorn (57) found that correlations between rate of growth in height and weight and various basal metabolism rates were not sufficiently high to suggest a "general growth rhythm."

Zuk (97) reported stable and consistent somatotype ratings on 152 subjects evaluated at ages 12, 17, and 33, growth in individual com-

ponents being somewhat more stable in females than in males. A gradual change in physique toward mesomorphy was noted for males and toward endomorphy for females. In a comparison of 26 obese and 26 nonobese girls from the upper high-school grades, Johnson, Burke, and Mayer (46) discovered that the caloric intake of obese girls was significantly less than that for nonobese girls and concluded that inactivity was apparently more important than overeating in contributing to obesity.

Greulich (31) compared the physical development of a large number of American-born and native Japanese children. The former were taller, heavier, more advanced skeletally, and, during the prepubertal period, distinctly longer-legged than children in Japan. Henton (38) reported no significant differences in mean ages of first menstruation between a sample of white and Negro girls in a southern city.

Mental Development

Using data from the California Adolescent Growth Study, Bayley (7, 8, 9) emphasized the individual variations in mental development and the difficulty of predicting terminal ability because of the variability of ages at the ceiling of growth (7), the different samplings of mental abilities at various ages (8), and the increase of variability in IQ with increase in age (9). The regular increase in variability of mental age scores in early adolescence was interpreted as a true state of increased variability in intelligence. A re-analysis of Harvard Growth Study data by Cornell and Armstrong (16) revealed four different major patterns of mental growth. Cornell and Armstrong also noted similar variations in growth of intelligence during early adolescence and reported that tests given between ages 7 and 10 were more likely to predict adult mental maturity than those given between ages 11 and 15.

Schoonover (74) analyzed some of the longitudinal data from the University Elementary School at the University of Michigan and found a substantial amount of sibling resemblance in both intelligence and achievement, increasing with greater intelligence. For 198 ninth-grade boys, Tallent (83) found a positive relationship between intelligence and behavior control. Navaho Indian youth scored significantly lower than the standardization groups on the *Wechsler Adult Intelligence Scale* (42) and on the *Raven Progressive Matrices* but not on the *Goodenough Draw-a-Man* (62).

Family Relationships

From questionnaires returned by several thousand graduating high-school seniors in the state of Washington, Landis concluded that children from democratic homes were better adjusted than children from authoritar-

ian homes (51, 52), and that authoritarian homes were more frequently associated with large families (53). In another study of large families, Bossard and Boll (11) noted a similar phenomenon, that maladjusted children came oftenest from homes in which the father was domineering.

In an investigation utilizing the *Thematic Apperception Test* to reflect changing relationships of adolescent girls to parents, Liccione (54) interpreted the greater mother-daughter disharmony (as compared to father-daughter disharmony) as being a function of the greater interaction of mothers and daughters. Payne and Mussen (63) found that boys with a high father-identification were calmer, friendlier, and more masculine in their interests than were boys who showed a low father-identification. Rose (68) and Warnath (90) reported that adolescents with greater family cohesiveness or closeness were more popular and socially effective with their peers than those with less family closeness.

Rosen (69) compared the influence of the family and the peer group on the attitudes of a group of Jewish subjects toward Kosher meats, and in other categories. Although the data pointed toward the greater influence of the peer group, the author cautioned against making generalizations. Family-life influences resulting from the effects of various ethnic and social environments upon personality were discussed by Havighurst and Neugarten (37).

Social and Emotional Adjustment

Using a word-association test designed to elicit evidence of psychological conflict, Powell (65) concluded that conflicts appear at an earlier age for females than for males, the greatest divergence being at age 13. Stratton (82), through an interview technique with a sample of 2000 girls, found that most girls in the 14- to 16-year age bracket were "under stress." Data obtained from a study by Elkin and Westley (25, 92) of 20 adolescents from the upper middle class in Montreal did not support the view that adolescence is a period of tension or that the peer group opposes parental values.

Several researchers studied the relationship between physical maturity and various adjustment measures. Mussen and Jones (60, 61) found further evidence that physical retardation among boys had adverse effects on personality and that physical acceleration was conducive to better social and psychological adjustment. A somewhat similar but less striking tendency was found for a small sample of girls by the same investigators (47). Davidson and Gottlieb (21) reported a tendency (not statistically significant) for postmenarcheal girls to be more emotionally mature than premenarcheal girls.

Edelston (23) and Gallagher and Harris (28) discussed representative problems of adolescents. In each of their short books, the authors stressed

emotional problems that center around sex and the struggle to fulfill needs for status and recognition. Liddle (55) found that the self reports of adolescents on the *California Psychological Inventory* agreed with ratings of their psychological adjustment by their peers and teachers.

The difficulty of measuring adjustment was pointed out by Ryan (71), Schutz (75), and Tindall (80). Ryan (71) obtained relatively low coefficients of reliability for ratings by teachers of their pupils on nine traits such as seriousness, initiative, and neatness, used as part of a report sent to parents. He concluded that teachers' ratings did not represent the discrete patterns of behavior that might be implied by the various trait names. Selected items from a problems inventory completed by 500 girls were subjected to a factor analysis by Schutz (75), who reported that the cluster structure did not correspond to any of the theoretical frameworks which have been proposed for classifying adolescent problems. Tindall (80) obtained low intercorrelations among 16 measures expected to be indicative of the adjustment of 66 boys and concluded that "a global concept of adjustment, based on present-day tests, is limited in usefulness."

A series of studies (3, 15, 56, 59, 72, 84, 85) of factors expected to be related to school persistence tended to stress situational rather than personal factors. Arnholter (3) and Cook (15), however, indicated that subjects who dropped out of high school before graduation were not so well adjusted as those who continued.

Tyler (89) analyzed by means of Kendall's W the patterns of adjustment of 30 boys in the California Adolescent Growth Study, as determined by a self-report inventory administered annually over a seven-year period. The value of W was found to be significant for only half of the subjects, indicating that social and emotional adjustment were quite erratic during the adolescent period.

Social Class and Behavior

Himmelweit (41), in a study of over 600 English schoolboys, found that middle-class boys were more integrated and more concerned, and had higher aspirations regarding school, than lower-class boys. Upwardly mobile boys had stronger middle-class values than middle-class boys. Reeves and Goldman (66) found some support for the general hypothesis that maladjustment is associated with discrepancies between internal and external measures of social-class level.

In studies relating to income, Coster reported that pupils from three income levels varied on items pertaining to interpersonal relationships (17) and that high-income pupils were most likely to participate in in-school and out-of-school activities, to hold office, and to be successful in school (18). The relationship between dating pattern and family position was studied by Hill (40). Most dating was done within the same social class, and those from the highest social classes dated most frequently.

Occupational aspirations for both boys and girls were found to be related to social-class factors (17, 22, 76, 78, 95, 96).

Social class was reported to be not related to attitudinal items on school (17), membership in "Y" groups (83), certain expressed values (70), and number of problems in 10 categories of fears and worries (21). The last study, however, indicated that the kind or direction of specific fears differs according to social-class membership.

Social Attitudes, Values, and Relationships

Sociometric status and its relation to other factors was explored by several investigators. Gronlund and his colleagues found both a persistent tendency (33) and a pervasive tendency (34) in status ratings. In one study, sociometric status determined at one time was found by Gronlund and Holmlund (33) to have predictive value of later adjustment in school. In the other study, Gronlund and Whitney (34) found that the extent to which junior high-school boys were accepted by their classmates was related to the degree of acceptance they achieved throughout the school and neighborhood.

Gronlund and Anderson (32) found that "talking" was characteristic of both accepted and rejected girls. Keislar (49) reported that girls with high marks rated as being less popular with boys but as being more influential. Marks (58) found that socially approved girls showed more social, heterosexual, and adult-disapproved interests, and had fewer intellectual-cultural interests than did socially unacceptable girls.

Ausubel (4) and Ausubel and Schiff (5) reported two sociometric studies related to the person's awareness of his status and that of others in the peer group. No relationship was found between sociometric status and sociempathy (4) or between the ability to perceive one's own sociometric status and the ability to perceive the sociometric status of others (5). Ausubel and Schiff (5) found also that sociempathic ability was unrelated to teachers' ratings of personal adjustment, scholastic competitiveness, or magnitude of academic aspirations.

Remmers and Radler (67) and Strang (81) analyzed self-reports from large numbers of adolescents and compiled the material into excellent summaries on such items as the adolescents' opinions, plans, problems, prejudices, and fears. Remmers and Radler's report (67) is based essentially upon various Purdue Opinion Polls and includes appropriate material from the first 45 poll reports. Boyer (12) surveyed high-school students in Milwaukee on a variety of questions relating to such topics as school, religion, parents, and world problems. Smith (77) found that pre-existing attitudes appear to be a better predictor of a person's responses to a heterogeneous intercultural experience than information about the experience itself. Negro children who were most self-accepting were found by Trent (87) to express more positive attitudes toward both Negro

and white children than were those considered least self-accepting. Attitude toward teaching as a career was studied by Johnson (45). A brief summary of the conclusions from the Girl Scout Study was given by Stratton (82).

Havighurst (30) summarized the results of research on the developmental-tasks concept around questions related to how the task is discovered and defined, how it varies with age and cultural background, and how performance can be measured. Dales (20), Douvan (22), and Zuk (98) reported independent results on a limited number of developmental tasks.

Amatora (1) compared self-opinion ratings of teachers, boys, and girls, and found boys' self-ratings lowest and teachers' highest. Christal and Ward (13) found athletic honors to be more predictive of future leadership among aviation cadets than nonathletic extracurricular participation and honors. Bartlett and Horrocks (6) studied the status needs of adolescents with one parent deceased. Witryol and Calkins (94) analyzed replies by rural youth to questions relating to social values.

Vocational Interests and Aspirations

Vocational interests and aspirations were found to be closely related to social status by Coster (17); Ezell and Tate (27); Sewell, Haller, and Straus (76); Stephenson (78); and Youmans (95, 96). Some researchers looking for background factors causing specific interests or aspirations stressed activity experiences (26, 96); residence, whether farm or nonfarm (35), and parental schooling (27).

Aspirations of adolescents as to both education and occupation were reported to be relatively high. Studies reviewed during this period are in agreement with many earlier studies which showed that the adolescents' hopes typically far exceed expectancy in these areas. Ezell and Tate (27) and Sewell, Haller, and Straus (76) reported that a high proportion of both boys and girls expected to go to college. Aspirations to a profession were indicated by a large number of the participants in surveys by Ezell and Tate (27), Payne (64), Stephenson (78, 79), and Youmans (95). Payne found further that two-thirds of the boys in his study aspired above their fathers' ranks. Youmans (96) reported that work experience tended to make adolescents more realistic and cautious about expecting to achieve in one of the high-status occupations, and Stephenson (78, 79) pointed out that the adolescents' plans were much more realistic than their aspirations.

Payne (64) and Schmidt and Rothney (73) reported considerable variability, rather than consistency, among vocational choices of high-school youth. Hill and Hole (39), however, found that parents could accurately identify their child's top three interests by answering the questions on the *Kuder Preference Record* as they supposed the child would answer.

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CHAPTER III

The School Program: Aims of Secondary Education

VICTOR B. LAWHEAD

THAT "new occasions teach new duties" has been the dominant premise of recent discussion of the aims of American secondary education. The period of this review has been characterized by vigorous reappraisal and reduction prompted by changed conditions on the national and international scene. This chapter attempts to identify and summarize recent research devoted to approaches, nature, scope, issues, and trends related to the objectives of secondary education.

Basic Sources for Objectives

Though Havighurst (24) reported that research is likely to affect educational change when the concept of human nature is undergoing drastic revision or when the society is under heavy pressure for social change, most recent statements of educational aims take societal demands as a point of departure. The dearth of studies directly relating aims of education to individual development may point to general rejection of the learner and his needs as a source for determining institutional goals. For example, Woodruff (54) contended that objectives ought to be concerned less with need as psychologically defined and more with what students ought to have; the plethora of current statements in this vein attests to the popular acceptance of this view.

Developmental Studies

Of the studies which reflected sensitivity to human growth and development, French and others (18) distinguished between illustrative behaviors expected of mature high-school seniors and developmental equivalents for younger or less mature students. Muuss (33), analyzing differences in theories of adolescence held by American and European educators, found American concepts more psychologically oriented toward organismic views and European positions reflecting to a greater degree the impact of physiological studies. According to Havighurst (24), research on the conception of human nature that has most influenced educational goals has been that directed toward motivation for higher education of the ablest adolescents. Taking into account forces tending to make educational objectives respond to group and cultural pressures, Caswell (9) saw focusing education on the individual and his development as a minimal need.

Societal Demands and Secondary Education

Nearly all statements of new directions took into account changing societal conditions. As consideration for determining educational directions, Caswell (9) listed international tensions, intercultural tensions, atomic power, automation, increased leisure, value conflicts, and mass organization.

Observing the encroachment of mass society and its tastes on the functions of the high school, Riesman (43) called for a "counter-cyclical" policy which would delineate sharply the values of challenge rather than routine conformity. However, the studies of Getzels (20) on the acquisition of values indicated the relative ineffectiveness of the high school in bringing about shifts from other-directed to inner-directed values. Using the Riesman thesis (43) and the Spindler formulation of emergent secular values (50), Getzels (20) found high-school freshmen and seniors holding identical value patterns in relation to their curricula and scholastic attainment.

Commager (12) documented the success of the American high school in meeting nonacademic nineteenth-century goals and pointed to need for new objectives recognizing the lengthened period of professional training, lessened vocational needs, and the educative forces of mass media and other opinion-shaping agencies. His analysis of the school's undue emphasis on instilling patriotism, a holdover from a time when Americanization of an immigrant population seemed valid as national policy, was supported by Skaurud (47), whose study of trends during the last half-century indicated that a major goal in the study of history was development of a desire for the democratic way of life.

Whether the schools can play a decisive role in a transitional society was questioned by Potter (37), whose analysis of educational programs in transitional societies led to the conclusion that schools tacitly defend the *status quo* by avoiding controversial issues and by failing to teach students to examine social issues critically.

The relationship of social change to explicit tasks of secondary education was documented further by a number of studies which took into account the informal education of agencies other than the school. The Rockefeller Brothers Fund (44) asked if families had depended too much on the school to serve ends that would have been served best by the home. Tyler (52) extended the list of criteria separating the school's legitimate objectives and functions from those properly belonging to other institutions.

Education for Unity and Diversity

That high schools serve both general and vocational ends is a persistent traditional demand. The widely publicized reports of Conant (13)

and the Rockefeller Brothers Fund (44), as well as statements by Bush (8) and contributors to yearbooks, reiterated this dual responsibility. The first two of these studies, though affirming the success of the secondary school in general education, pointed to need for clarifying specific objectives of specialized education in order to improve the effectiveness of the elective program.

Bush (8) reminded educators of the unique strength of a comprehensive high school dedicated to the dual purpose of a general and a special education, in contrast to the lack of balance attending European secondary patterns. Yearbooks of the American Association of School Administrators (1) and the Association for Supervision and Curriculum Development (3) delineated both the reciprocal relationships and the distinctive natures of general and specialized education in respect to objectives.

Goals of General Education

Responsibility of the high school for general education was examined by independent and co-operative studies which reiterated the objectives found in earlier statements. Relating current goals to historical antecedents, Mehl (31, 32) identified political and social cohesion as an aim which has received consistent emphasis since the report of the Committee of Ten. As seen in the light of recent and current statements on the goals of secondary education, he noted that the report served as a benchmark in redefining the purpose and expectation of the high school, which was then emerging as the dominant institution of secondary education.

French and others (18) proposed the most comprehensive list of goals for the high school, following a pattern set forth earlier by the Educational Policies Commission. Within the areas of self-realization, human relationships, economic efficiency, and civic responsibility, the authors identified specific levels of behavioral competence in order to give additional meaning and clarification to general aims. The report, presenting a consensus of educational consultants, lay advisers, and reviewers from the public schools, sought specificity of behaviors to the end that high schools might evaluate their programs of general education.

Though this review is not primarily concerned with specific objectives within subject fields, three studies in American history, social studies, and music offered insight into trends in overall aims. Examining national committee reports since 1900, Skaurud (47) observed two major objectives of American history study: (a) to develop a desire for the democratic way of life and (b) to develop a desire to apply the scientific method to problems of American life. In a similar analysis covering roughly the same period, Cruikshanks (15) perceived a shift from the historian's emphasis on cultural heritage to the social scientist's emphasis on citizenship. Anderson (2), formulating objectives of general music study in the junior high school, discerned a high level of agreement among public-

school music directors, professors of music education, and general educators on the priority of general rather than technical objectives.

Responsibility for Specialized Needs

Nationally publicized statements of educational goals, though emphasizing the stiffening of intellectual requirements in general education, focused greatest attention on special-interest education—particularly elective choices of able students. In this regard the Conant (13) and Rockefeller (44) reports, as well as that of the President's Committee on Scientists and Engineers (41), pointed to the inconsistency of providing curricular choices without sufficient guidance and counseling. This defect of the elective system was seen as a deterrent to meeting aims related to the national need for manpower in scientific and technical fields.

Woerdehoff (53) believed that aims of vocational preparation should be directed toward versatility, resourcefulness, and adaptability. The Educational Policies Commission (34) emphasized the importance of vocational aspiration as a motivating force for students at all levels of capacity, whereas Griswold (22) found that vocationalism interfered with the main objectives of liberal education.

Classification of Educational Objectives

Search for a Unifying Goal

Research dealing with the objectives of secondary education did not emphasize problems of classification; however, one discerns at least three characteristics among those proposals and statements which gave attention to taxonomy. In the first group of studies the central problem was to find a single unifying objective which would stand as a point of departure for all other tasks of educational programs.

Hogan (25) and Ley (28) saw preparation for wise decision-making as a controlling aim for both regular and co-curricular studies; Smith (49), similarly stressing reflective thinking, pointed out that, just as the "Three R's" served as a basic goal of elementary education at one time, reflective thinking, because of its centrality, could serve the broad concerns of the high school. Writing from a similar viewpoint, Hartung (23) suggested a number of procedures and tests for teaching reflective thinking. Being interested in the implications of secondary education for continuing education, the Fund for Adult Education (19) recognized the disciplining aim of "learning to learn."

Traditional Patterns

A second category of studies depended on earlier classifications of objectives (such as the Seven Cardinal Principles and the Ten Imperative

Needs of Youth) for their basic organization. The persistent influence of the 1918 formulation of goals by the Commission on Reorganization of Secondary Education was seen in the six aims listed in the publication edited by Bereday and Lauwerys (5). Of the original seven guiding principles, only education for family membership was omitted from the 1958 list. An analysis by Bridgers (7) of the works of eight prominent writers in the curriculum field revealed similar emphasis on five of the earlier aims, with additional separate emphasis on aesthetic appreciation, consumer economics, and social adjustment. Nickel (35) found a high degree of concurrence among West Virginia school men on the educational goals implied in the Ten Imperative Needs of Youth. Of nine statements on objectives, eight contained all but one of those formulated earlier by the National Association of Secondary-School Principals. Lingren (29) used the principals' list to assess the status of secondary education in four situations in Pennsylvania, and the 1958 yearbook of the American Association of School Administrators (1) reiterated the basic relationship of its goals to the statement on imperative needs.

The classification of educational objectives popularized by the Educational Policies Commission in 1938, which included self-realization, human relationships, economic efficiency, and civic responsibility, provided the basic orientation for the study of behavioral goals sponsored by the Russell Sage Foundation (18). The latter report classified behaviors in four areas of living: (a) Attaining Maximum Intellectual Growth and Development, (b) Becoming Culturally Oriented and Integrated, (c) Maintaining and Improving Physical and Mental Health, and (d) Becoming Economically Competent. An additional classification of the direction of growth within each of the four areas of behavioral competence was made in respect to growth toward self-realization, desirable interpersonal relations in small groups, and effective membership or leadership in large organizations.

New Departures

New and fresh perspectives characterized a third category of studies of the ordering of educational aims. A committee of college and university examiners (6) proposed a new classification of educational objectives in the cognitive area of aims. Though its report was not necessarily aimed at secondary education, the committee offered a six-point taxonomy useful to high schools in evaluating the effectiveness of goals related to knowledge, comprehension, application, analysis, synthesis, and evaluation. Pace (36) defined the integrating potentials of educational objectives and offered new approaches to their classification.

Goodlad (21) called for an overall conceptual system to help determine priorities in objectives. Such a system, he maintained, would help the high school find its unique function. Dreiman (17) charged the high schools to help students "to be excited about ideas, to be unawed by

power, to be unafraid of controversy, and not to be content within themselves."

Who Determines Educational Directions?

Public policy as to educational objectives was influenced increasingly by private foundations and groups holding little or no legal responsibility for public education. Through widely circulated reports and generous press coverage, their proposals have made such impact that the question of who determines educational directions becomes pertinent to this review.

Part of the difficulty in achieving a wider consensus stems from the fact that the "public" to be considered is not one but many. Thus Bayles (4) found that many disputes ostensibly over the aims of education are in reality group conflicts over control of the schools. He urged the teaching profession to rid itself of the tendency to avoid conflict and urged that it strive to realize the ideal of free inquiry in the school. On the same issue, Smith (48) urged that the lines between professional autonomy and legitimate public authority be drawn more explicitly.

Increased Participation by Laymen

Studies reviewed showed the increased influence of laymen on the direction of secondary education. The dangers of relying too heavily on lay opinion for educational direction were reported by Riesman (43) and Commager (12), who saw objectives thus derived as functioning only to perpetuate the *status quo*. Specifically, Deam (16) found a 20-percent sample of Virginia school-board members more conservative than social science teachers in setting the limits for discussing controversial issues with students. In a survey of aims held significant by parents, students, and English teachers, Cook (14) found that parents and students gave more stress than teachers to formal language study and less stress to dealing with an understanding of mass media of communication. Woodruff (54) insisted that it is not in keeping with American traditions to have educators formulate educational aims.

Role of College Personnel

Related to the shift toward increased participation by laymen in formulating objectives has been noticeable interest in, and action by college administrators toward, redirecting the efforts of the high school. Whereas preparation for college was merely implicit in earlier statements of the goals of general and special education, in the Conant Report (13) and others it became explicit and definite.

The influential role of college professors and administrators as board members of the great foundations is best seen in the membership of the Special Studies Project (Panel V) of the Rockefeller Brothers Fund (44). Of its 15 members, nine held college and university positions, and none was directly responsible for secondary education.

Consensus Studies

A summary of doctoral studies bearing on the aims of secondary education indicates that independent investigators attempted to establish a consensus, particularly among educators and laymen, and in some cases among students, regarding the proper tasks of the high school. Using an opinionnaire specifying 50 representative goals in English instruction, Cook (14) compared the preferences of parents, high-school teachers of English, their graduates then enrolled in college English courses, and the directors of college programs in the subject. He found parents and students to be more conservative than high-school and college faculty in respect to goals.

A broader survey by McWilliams (30) of high-school teachers on the objectives of secondary education revealed that teachers agree readily with modern aims when they are stated as general principles but retreat from implications which involve changes in routine or threats to existing patterns of instruction. Schilling (45) found 1945 high-school seniors (a 5-percent sample of all seniors in Indiana in 1957) highly favorable to seven and somewhat favorable to five of 14 current proposals for strengthening the academic program. They rejected only two proposals, a lengthened school year and a thirteenth year for vocational training.

Other studies included Shineman's investigation of criteria for a secondary program for youth not preparing for college (46); Nickel's survey for educators and citizens in West Virginia (35); Deam's comparative analysis of opinion of school-board members, administrators, and social studies teachers on the problem of handling controversial issues (16).

Of the reports widely circulated and publicized, that of the President's Committee for the White House Conference on Education (38) presented the widest sampling of views. In all states preliminary conferences, attended by educators and laymen (distributed 1 to 2), were held at local and state levels prior to the national meeting.

Trends and New Directions

Viewing the current debate about educational aims, one must recognize the relationship described by Keppel (26) between national policy and establishment of objectives for high schools. This trend, supported by the statements and research described in this chapter, points to new directions in three related areas: (a) redefinition of the role of the secondary

school as a preparatory institution for education beyond the high school, (b) a concerted effort to give intellectual pursuits first priority, and (c) an attempt to specify distinctive goals for the most able students.

Preparation for Education Beyond the High School

The context of this new direction is seen in the reports of the President's Committee on Education Beyond the High School (39, 40), which identified four major educational complexes with which secondary aims and programs must articulate: (a) the traditional system of schools and colleges, (b) the expanded role of military training, (c) programs operated by private business for its employees, and (d) the widened scope of programs of adult or continuing education. As universal education is likely to be defined in terms of the impact of any or all of these complexes on great masses of youth, recent statements influenced by the colleges and universities have emphasized that proper articulation calls for the high school's relinquishing certain goals best served by other agencies and accepting greater responsibility for college preparation.

Traditionally high schools have tried to serve the special needs of youth bound for college through a broad general education and through special-interest offerings appropriate to their future vocational preparation. Conant (13) added, as a main objective of the comprehensive high school, the task of providing "satisfactory programs for those whose vocations will depend on their subsequent education in a college or university." Papers presented at the 1957 Conference on the American High School (11) summarized the basic arguments for better articulating secondary education with the work of the universities. The emphasis of this conference on the high school's responsibility for college preparation was observed by Rehage (42), who pointed to omission of consideration of its relation to elementary education.

First Priority to Intellectual Pursuits

A related trend was increased emphasis on the intellectual component of secondary education. The 1955 White House Conference on Education (38) charged school boards to study the problem of priorities, and the Committee recorded its belief that "the development of intellectual powers . . . is the first responsibility of the schools." The Chicago Conference (11) reiterated this stand in the papers of Chase (10), Commager (12), Kimpton (27), and Tyler (52).

Improved educational possibilities within the family, the church, and other agencies led Bush (8) to support editorially redirection of secondary education along more intellectual lines. Similarly, the report of the Rockefeller Brothers Fund (44) emphasized need for efficient use of intellectual talent not only in the schools, but also in society.

Challenging the Academically Talented

Studies of educational objectives have had most noticeable effect (24) in setting higher expectations for able students. Almost as if to counter earlier statements of objectives which suited the broad middle band of capacity, recent proposals referred particularly to the academically talented. To try to develop individual capacities of all students seemed to many observers inappropriate when our technical and scientific leadership has been challenged.

Setting of special objectives for students with great intellectual promise was to be noted in the reports of Conant (13), the White House Conference on Education (38), the American Council on Education (51), and the Educational Policies Commission (34). Nearly all such studies rejected special secondary institutions for this group, and most of the highly publicized proposals listed here emphasized the need of improved counseling in respect to the choice of elective subjects, special grouping of students in required subjects, and, to some extent, provision for accelerated progress—all within the scope of the comprehensive high school's aims.

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CHAPTER IV

The School Program: Curriculum Content and Organization

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RESEARCH in curriculum content and organization has become increasingly the province of large organizations, bureaus, and foundations. Major contributions have been made by the National Education Association, the U. S. Office of Education, the National Science Foundation, the large endowment foundations, and state departments of education. Substantial contributions have been made in such publications as Conant's *The American High School Today*. In addition to the above, significant research by individuals pursuing studies in graduate school has been noted here.

Trends and Emphases

Basic research in orientation and selection of curriculum content and its organization remains curiously nonexistent. The 1956 Yearbook of the Association for Supervision and Curriculum Development (7) candidly admits having no answer for the title question, *What Shall the High Schools Teach?* Adler and Mayer's *The Revolution in Education* (1) reviews and restates aspects of the problem. A host of commentaries (65) urge research. A variety of status studies (67, 92) and descriptive studies (12, 17, 78) exist.

Several generalizations concerning the orientation of the school curriculum may be taken for granted: (a) The curriculum is a reflection of social requirements. (b) It is oriented about purposes. (c) It is changing. (d) It is peculiar to the individual school. Special emphases since 1954 are: development of curricula for the academically gifted or talented and the juvenile delinquent, the core program, and appraisal and criticism of secondary education.

An obvious illustration of society's reflection in the schools is the recent concern for the academically talented and gifted. Though research on the gifted (94) was common prior to Sputnik, since the autumn of 1957 a deluge of comment has appeared (28, 71, 83). Lightfoot (51) quoted Liddle's unpublished report on classes for slow learners in Quincy, Illinois, an investigation of special value because it attempts to ascertain the feelings of slow-learning pupils at being placed in separate classes. Pupil response tended to be negative.

Witty (94) reviewed contemporary practices in educating the gifted; Conant (23) postulated curricular organization requirements for academ-

ically talented pupils; and the Commission on Research and Service of the North Central Association of Colleges and Secondary Schools (9) studied guidance and motivation of superior and talented students. Pressly (71) reported on the curriculum for the gifted pupil in Atlanta, Georgia, which provides enrichment in mathematics, the sciences, English, the social studies, and a foreign language.

The College Entrance Examination Board (21) described college-level high-school courses for gifted students seeking advanced placement upon entering college, which were developed as a result of the study carried on from 1952 to 1955 by the Committee on General Education in School and College. Problems related to identification of gifted children (28) continued to be investigated, as did programs of studies (64), methodology (50), and materials for study (38).

Interest increased in curriculum organization and content for juvenile delinquents. Common problems are identification of the delinquent (75), prognosis (43), programs of study (47, 49), and the role of the school in contributing to delinquency (48).

Recent intensification of interest in problems of juvenile delinquency has promoted research which bears on the organization of the secondary-school curriculum. Kvaraceus and others (49) reported practices of school systems providing help for predelinquent and delinquent youth through curriculum adjustments. In general, these adjustments tend toward reorganized curriculum structures and requirements for youth of junior high-school age and toward co-operative programs to provide work experience for youth of senior high-school age.

What should constitute the core curriculum remains a crucial question. Its function is frequently misunderstood (3), and its growth is not commensurate with attention given it in the literature. Wright's latest survey (96) indicated that block-time, subject-centered programs were more extensive in 1957 than in 1952, whereas block-time, experience-centered programs were less common in 1957 than in 1952. Nevertheless, basic research in the experience-centered core curriculum has been extensive and varied (55, 58, 99). Research centers about the role of subject matter (57), the selection of problem areas (55), and the implementation and supervision of core programs (53).

Appraisal and criticism of education continued. The Conant Report, *The American High School Today* (23), emphasized subject-matter courses in a comprehensive high school. Conant recommended a specific curriculum content and organization for the academically talented, improved counseling services, extension of the foreign-language program, ability grouping, emphasis on English composition, a diversified program for the development of marketable skills, special consideration for very slow readers, an academic inventory, an academic honors list, a developmental reading program, a summer-school program, required courses in science and social studies, and a homeroom program. Adler and Mayer questioned

the purposes of modern education (1). Ten basic criticisms of public education were summarized by the NEA (63).

Course Offerings and Enrollments

Despite increased enrollments in secondary schools since 1954 (79, 80, 81, 82), there are few data to show changes and shifts of enrollments in specific courses and subject fields, except in science and mathematics (14) where the percentage of pupils enrolled has increased.

Brink (12), studying curriculum organization problems of high schools with more than 1000 pupils, found continuation of the trend from multiple curriculum organization toward constants-with-variables organization. He encountered wide variability of curricula in large schools, continued rapid expansion of the number of courses in all subject areas, an increase in requirements for graduation in both major and minor fields, and a tendency toward listing courses as a sequence (e.g., English I, English II), rather than giving courses descriptive titles (e.g., Beginning Composition and Grammar, American Literature).

Woods (95) found that school size apparently makes no difference in the availability of curriculum offerings or in pupils' reactions to the activities program, but believed small schools less effective in communication with parents and students concerning curriculum offerings and less effective in organizing and administering an activities program. Woods's study seemed to refute the contention that large schools lose sight of individual needs and that large schools tend to deny opportunity for participation in activities programs.

Eells (31) compared the numbers of high-school students enrolled in mathematics, science, and foreign-language courses in 1954 to those enrolled in the same courses in 1900 and drew attention to errors resulting from a misuse of percentages in reporting enrollment figures. Flannigan (35) found that, as early as 1954, general education science courses were increasing in number and were beginning to replace conventional courses in physics and chemistry for students not expecting to attend college. The value of general education science study for the nonscientist received increased recognition.

State Requirements

The U. S. Office of Education's study of high-school graduation requirements (100) revealed a lack of uniformity among the states. For example, 15 states required four years of English; 22 states, three years; and 11 states had no English requirement. Eleven states required three years of social studies; 16 states, two years; 10 states, one year; 11 states had no social studies requirement. Four states required two years of science; 23,

one year; 21 states had no science requirement. Mathematics requirements were similar to those for science. Of states reporting no requirements in 1932, in 1956 six required English, nine required social studies, four required mathematics, and four required science.

An NEA Research Division study (62) showed that 68.2 percent of all high school students were enrolled in mathematics classes and that 59.2 percent were enrolled in science classes. Interest in science and mathematics beyond state requirements was indicated by the following findings: (a) of 1957 graduates, 14.2 percent had completed four or more years' study of science, 21.6 percent had completed three years, 36.9 percent had completed two years, 22.8 percent had completed one year, and only 1.5 percent had completed none; (b) 14.4 percent had completed four or more years' study of mathematics, 22.9 percent had completed three years, 35.2 percent had completed two years, 25.6 percent had completed one year, and only 1.9 percent had completed none. Voss (92) found that science enrollments in Iowa increased from 57.41 percent in 1933-34 to 59.45 percent in 1957-58.

Subject-Matter Emphases

An attempt has been made in this survey of particular courses of study to identify major research efforts. Since other chapters of the REVIEW have been devoted to exhaustive analyses of a particular content area (72), no attempt will be made to duplicate such reports.

Business Education

Studying basic concepts of business education and content determination for business courses in secondary schools, Bender (8) evaluated the beliefs of selected educators in the field and from them postulated concepts underlying business education. Crank (26) analyzed research, examined textbooks, and surveyed opinions of businessmen, professional men, and parents to determine topics, facts, principles, and concepts of greatest importance in the basic business and economic education of high-school students. More attention was given, however, to surveys describing offerings of business education programs. State-wide studies were made by Stewart (88) in Connecticut, Clements (20) in Oklahoma, Erickson (33) in California, and Maxwell (56) in Michigan.

Business practices and problems were explored, with a view to determining curriculum content. Lunn (52) and Cox (25) studied business letters and their composition. Arensman (6) gave his attention to problems of dictation. Casebier (18) made a job analysis study of the secretary. Some research was done on problems created for education by increased use of business machines. Converse (24) investigated punch-card operations in educational programs, and Kahn (45) stenograph machine shorthand.

Core Programs

Research on core programs was more extensive than that in any other area. Comment is here limited to research on the nature of core programs, their present status, and their organization.

The ambiguity of the term *core program* has required a definition by each writer. Alberty (3) continued to enumerate series of general education curricula as "types" of core, proposing that the core program consist of "that portion of the total curriculum of any secondary school that is designed primarily to develop the common values, understandings, and skills needed by all for effective citizenship and hence is required of all at a given level." Alberty identified six types of core programs. "Type One" core program comprises the separate subjects required of all students at a particular grade level. "Type Two" core program consists of an informal correlation of two or more subjects. "Type Three" core program provides for a deliberate, systematic correlation of two or more subjects. "Type Four" core program is a fusion of two or more subjects; in this program the content is organized in units of work, and the separate subjects tend to lose their identity. "Type Five" core program is organized specifically to meet adolescents' needs and to deal with their problems; subject matter is incorporated extensively in the learning units, but does not provide the primary guide and direction. "Type Six" core program is similar to "Type Five" except that there is no preplanned structure.

Wright (97) distinguished "core" from "block-time" classes and defined a core program as: "Classes having the block-time organizational pattern and which also unite or fuse their content around units or problems which may be either subject-centered or experience-centered." Faunce and Bossing (34) defined essentials of the core program as "those learning experiences that are fundamental for all learners because they derive from (1) our common, individual drives or needs and (2) our civic and social needs as participating members of a democratic society."

Other classes of the core-program type are commonly referred to in the literature as: basic education, common learnings, general education, self-contained classrooms, social living, and united studies.

Despite lack of agreement as to terminology, writers are in accord that the core program should utilize a large block of time, should incorporate extensive homeroom and guidance functions, and should provide opportunities for enrichment or remedial instruction (1, 10).

The Status of Core Programs

Although a scattering of studies regarding the status of core programs exists, the only comprehensive survey is a continuation of the questionnaire studies conducted by Wright under the auspices of the U.S. Office of

Education. The first, "Core Curriculum in Public High Schools" (98), was followed by a study of problems and practices (97). "Block Time Classes and the Core Program in the Junior High School" (96) is the latest. Bossing reported on the trend toward core curricula (11).

Wright (97) found *core* the term most commonly used to identify the block time classes: (a) Block-time classes were found in 487, or 19.3 percent, of the sampled schools. (b) Among junior high schools, 31.4 percent had block time classes, the comparable figure for junior senior high schools was 12.1 percent. (c) Large schools were more likely than small schools to have block-time classes: 43.5 percent of schools enrolling 500 pupils or more reported such classes, whereas only 11.3 enrolling fewer than 500 pupils reported them. (d) When schools abandoned the practice of scheduling block-time classes, the reason most frequently cited was inability to obtain adequately prepared teachers. (e) Of block time classes, 68 percent taught separately the subjects combined in the block class; 20 percent united or fused subjects in a subject-centered core program; 6 percent had an experience-centered core program based on structured or predetermined problem areas; and 6 percent had an unstructured core program.

Organization of Core Programs

The organization of core programs varies greatly. Subject combinations were reported by Wright (96); 86 percent incorporate English and social studies. The content and organization of core programs organized to satisfy "adolescent needs" are more difficult to summarize. Alberty (2) studied the contributions of mathematics to the core program, and Orr (68) investigated art experiences in core classes.

Marani (55), attempting to clarify problem-area structure in the "Type-Five" core program and to develop a problem-determining technique, saw problems of adolescents falling into areas of (a) self-understanding, (b) healthful living, (c) home and family living, (d) personal-social relations, (e) education and school living, (f) vocational preparation, (g) living in the community, (h) democratic government, (i) economic understanding, (j) relationships with minority groups, (k) intercultural understanding, and (l) finding values by which to live.

Writings (35) indicate that many core programs devised to meet "societal-adolescent needs" are deliberately unstructured and unorganized in both their scope and sequence.

Distributive Education

Research in distributive education concerned itself with surveying practices or developing programs. Jones (44) surveyed the federally supported programs in Pennsylvania; Donaldson (30), the distributive edu-

cation programs in Illinois; and Gradoni (39), selected programs in New York State. Scolnick (85) and Kraushar (46) gave attention to setting up courses of study and distributive education programs in New York City.

Mathematics

Among the organizations carrying on study and research aimed at improving high-school mathematics instruction were: the School Mathematics Study Group, the Secondary School Curriculum Committee of the National Council of Teachers of Mathematics, the University of Illinois Committee on School Mathematics, and the Commission on Mathematics of the College Entrance Examination Board.

The widespread interest in improvement of mathematics instruction was further illustrated by the financial support of the National Science Foundation to the School Mathematics Study Group, and even more important was the emphasis on mathematics in the year-round institutes sponsored by the National Science Foundation.

Reports of these and other groups reflected the following trends: (a) increased mathematics requirements for all students (100); (b) increased offerings for the students in grades 9 through 12 (100); (c) development of unified courses (74); (d) emphasis on concepts as opposed to teaching by demonstration and drill (13, 61, 74); (e) elimination of traditional, nonfunctional content and the inclusion of concepts hitherto relegated to college mathematics (13, 17, 22, 59, 61); (f) increase of enrichment material treating mathematical ideas and lessening of emphasis on mere computation (69); (g) freedom for able students to advance as rapidly as their interests and abilities will permit, allowing them to take advantage of opportunities for advanced placement in college (21).

Capehart (17) reported a University of Illinois study on the co-ordination of algebra and analytic geometry. Heinke (41) explored the possibility of increasing student competency in the discovery or generation of new theorems through the process of variation. Albrecht (4), in a critical and historical study of the role of ruler-and-compass constructions in high-school geometry, indicated that neither exclusion of nor prolonged use of the compass and ruler was suitable to modern geometry teaching.

Freitag (37), in a historical study, formulated five theses and eight assumptions concerning the outcome of mathematics teaching but was unable to generalize about method or content. Steinbrenner (87) studied the concept of continuity for teachers of secondary-school mathematics.

Payne (69) studied enrichment for groups of varying abilities, and Wales (93) made recommendations concerning course content on the basis of a national survey and analysis of courses. Rosskopf (74) observed trends in mathematics teaching during the first half of the twentieth century and related these trends to psychological experimentation, the philosophy of John Dewey, and socioeconomic developments.

Van Deventer (91) developed a procedure for the study and revision of mathematical curricula based on the Illinois curriculum program. Nielsen (66) surveyed mathematics instruction in Iowa high schools. Scott, Foresman and Co. (86) made summaries of studies, both local and state, whose findings will be available early in 1960. Brown (13) listed more than 70 questions related to mathematics instruction which need to be answered.

Science

The National Science Foundation (90), through federal grants, gave impetus to revisions of content, organization, and method in science courses. Much of the research and experimentation was in process and final reports had not been made. The study committee on chemistry was being organized. The study committee on biological science was at work. The first annual report of the Physical Science Study Committee (84) was published in January 1958. During the academic year 1957-58 a preliminary study of content and organization of science courses was conducted in eight high schools. The Physical Science Study Committee (40) prepared a preliminary draft of a new physics textbook whose content had been tested in these schools.

Probably the most important trend was from a Newtonian to an atomic picture of the universe (90). A corollary trend was from consideration of the various physical sciences as separate disciplines to recognition of their unity. These trends brought increased awareness of the importance of science as method and the transient value of certain scientific subject matter.

Fonsworth (36), studying outcomes of a problem-solving approach and a factual-information approach in the teaching of chemistry, saw little difference in the amount of traditional content remembered. However, the problem-solving group scored better on tests requiring thinking ability. Caldwell (16), through an analysis of published materials, isolated 296 earth-science principles judged to be desirable for inclusion in science programs of general education. Burleson (15) developed procedures and materials for the study and revision of science curricula in any secondary school.

Although considerable emphasis has been given to a revision of the content of college-preparatory physics courses, little research was done on the content of general science courses. No studies were reported on the content of courses devoted to the study of space.

Social Studies

The dearth of experimental research in social studies may be accounted for by the difficulties of obtaining objective data applicable to general

goals in the area. Hill (42) used experimental and control groups to test the hypothesis that the organized study of selected materials pertaining to social class helps high-school pupils formulate attitudes toward self, others, social justice, and democracy, and helps them in the choice of their friends. In no case did the experimental groups appear to benefit more than the control groups.

Andrews (5), Peck (70), Rambeau (73), Runge (76), and Rusteika (77) performed related research which brought together generalizations to aid in selection of textbooks for social studies. They sought to furnish a guide to the planning of learning experiences, the preparing of text, audio-visual, and other resource materials, the adapting of teaching methods, and the selecting of instructional materials. Their procedures were as follows: (a) to collect bibliographies in anthropology, economics, geography, political science, and social psychology; (b) to have the bibliographies rated by selected specialists; (c) to select final bibliographies of 62 texts for their respective fields of inquiry; (d) to analyze the texts in order to determine significant generalized ideas in those fields; (e) to record and code the generalizations.

Similarly, the Committee on Concepts and Values of the National Council for the Social Studies (60) examined 14 themes which have been developed and amplified for use in grades 1 through 12 and provided 16 to 39 illustrative concepts and generalizations to aid in the development of each theme into curricular material.

Cruikshanks (27) traced development of the social-studies curriculum throughout the last 50 years and found much evidence to indicate that textbooks are major determinants of the curriculum. Social-studies textbooks came under scrutiny of researchers attempting to determine quantity and quality of text material about specific countries and peoples. Takaki (89) searched history texts for material dealing with Japan and the Japanese. Deodhar (29) similarly examined social-studies texts for material on India. Both authors saw improvement, in that recent texts showed greater space allotments, a better balance in the presentation of content, and a more objective approach to their respective countries.

Some research in social studies has been of a philosophical nature. McClellan (54) investigated the question of whether or not instruction in history produces a person better able to control his environment than he would be without the instruction. Engle (32), treating the relationship between imparting knowledge of human culture and teaching history, contrasted alternative procedures: (a) the chronicle or saga-of-the-society approach and (b) the approach which makes the cultural process an explicit datum and frame of reference in the study of history. She favors the latter. Such research as this should open doors and provide ideas for further research of a more empirical nature.

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CHAPTER V

The School Program: General Instructional Procedures

JOSEPH R. ELLIS

After brief consideration of changed concepts of method, attention is given here to four basic aspects of instruction: (a) organization of the learning situation, (b) maintenance of interpersonal relations conducive to effective learning, (c) guidance of learning experiences, and (d) evaluation of learning. The need for research in the area of instruction is summarized in the concluding section.

Changes in Concepts of Method

Methodological research in recent years has depicted many significant educational needs of our time (14, 26, 33, 41, 45) and has indicated an effort to adapt scientific and technological developments to improvement of educational methods (25). Most studies cited in this chapter reveal a greater concern for techniques of instruction than for a broader concept of method.

Organization of the Learning Situation

Recent research has dealt with organizing the learning situation to achieve the most efficient and effective use of teachers and other resources. Wrightstone (58), surveying research related to class organization, observed that, even when pupils are grouped according to ability, marked individual differences exist. Ohm and Howe (39) reported results from an experiment in which students were grouped according to immediate needs of the learning situation; the procedure required flexibility in group composition, scheduling, and instruction.

Harrah (19) found that, of five kinds of grouping, friendship grouping gave best results on measures of achievement and social behavior. Hoover (22) concluded that the same motivational activities were not effective for slow, average, and superior learners. Lynch (31) sought to develop a theory of educational motivation centered around the organizational aspects of cognitive clarity, affective quality, and ego-involvement.

Michael and others (34) stated that instruction for the gifted should include procedures involving creative work, ideas, and investigation. Passow and others (41) called attention to the need for providing the

gifted with enrichment in both breadth and depth of experience. Eales, Reed, and Wilson (11) and Welke and Bragg (55) surveyed secondary schools in Wisconsin and California, respectively, and found definite trends toward ability grouping.

Gronlund (16) reported that dual grouping in student-centered teaching promoted participation, social growth, opportunities for leadership, and communication. Bills (4) found support for the hypothesis that student-centered teaching and client-centered therapy resulted in similar personality changes. Thompson and Tom (53) concluded that student-centered patterns of instruction in vocational agriculture classes resulted in greater achievement and produced an atmposhere more conducive to guidance than did teacher-centered patterns.

Studies in Colorado (26), Illinois (3), and Massachusetts (5) involved experimentation with team-teaching and -planning, flexible scheduling and grouping, and classes of various sizes. Findings, though tentative, favored many of the aspects of the experimental approaches.

Maintenance of Interpersonal Relations for Effective Learning

The relationship between teacher and learner is considered by many to be a critical factor in the learning situation. Bush (6), viewing teaching as essentially a problem in human relations, reported on the Stanford study of characteristics of effective teacher-pupil relationships. Findings indicated that the pupil's feeling about the teacher was the critical factor in developing an effective learning situation.

Hoyt (23) found that the teacher's knowledge of the learner's characteristics tends to improve the learner's attitude toward the teacher. Oliva (40) prepared a "primer" for adolescent discipline in a democratic society. Lane and Beauchamp (29) characterized mature group relations as involving continuous growth from hostility, insecurity, and inadequacy toward greater acceptance, security, and adequacy.

Much of the concern for mental health has centered on the school. Labrant (28) described certain practices in secondary-school classrooms which create situations that are harmful to the adolescent's mental health. Regan (42) found students under authoritarian teachers to have more school-connected fears than students taught by democratic teachers.

Guidance of Learning Experiences

The last five years have witnessed many promising experiments with a variety of instructional procedures. Although it is too early to draw conclusions from much of this research, definite trends are indicated. Stoddard (49) noted the use of television not only to enrich and supple-

ment instruction, but also to perform some of the tasks of the teacher. Hobbs (21) described a network of educational television stations in Alabama which provides direct teaching, as well as supplemental and enriching experiences to classrooms throughout the state.

Teaching by Television (14) summarized experimental studies in the use of television in more than 100 school systems. Findings indicated generally that: (a) The team approach is successful. (b) There is no significant difference in achievement between students taught with the aid of television and those taught conventionally. (c) Television teaching increased the use of the library and the responsibility of the learner. (d) Presentations were more carefully planned and made better use of teacher abilities and instructional materials than does conventional teaching. (e) Classroom teachers had more time to plan and to provide individual help to students. In the Evanston Township High School's experiment with closed-circuit television (8) similar results were found. Many of these studies limited their evaluation to paper and pencil measures of rather narrow outcomes.

An NEA survey (36) showed an increase in availability and use of practically all kinds of audio-visual equipment; particularly was this the pattern in larger school districts. Wendt (56) surveyed research in the field of audio-visual instruction and described effective procedures employing multisensory aids.

A comparison of student achievement and interest in experimental and control groups in the Utah Physics Film Project (38) indicated that: (a) Physics can be taught effectively by an especially prepared set of films. (b) Schools lacking adequately prepared teachers and adequate equipment can use such films profitably, either as supplements or as entire courses. (c) Although significant differences were not found between the gains of the two groups, raw gains generally favored the control group. Sipe (47) found a similar study in Tennessee to support the Utah study, but he noted that it indicated need to strengthen regular instructional procedures.

Investigating teaching by means of recorded sound, Gibson (15) tentatively concluded that junior high-school students could thus be taught conversational Spanish and spelling as effectively as by conventional methods. Findings of a two-year experiment at Snyder, Texas (25) tended to support the general hypothesis that instruction by teams of teachers with staff aids, working with students in large groups and subgrouping according to the demands of the learning situation, using closed-circuit television and other instructional aids, and increasing teacher-pupil planning for small group and individual work in unit-type activities are more effective than the traditional method employing one teacher for a class of 20 to 25 secondary-school students.

Johnson and VanderHorck (24) described an experiment using noncertified laboratory assistants to extend opportunities for learning science for high-school students.

The gifted learner received increased attention. Davis (10), observing techniques of instructing gifted students in schools throughout the country, found effective procedures to include research, individual study of significant problems, and discussion groups. Martinson (32) reported on a state-wide study in California which sought to determine effective ways of providing for the gifted. The New York State Education Department (37) described practices to provide challenges and opportunities appropriate to the gifted in New York State secondary schools. Havighurst (20) reported a definite trend toward ability grouping based upon intelligence test scores, grades, and teacher recommendations.

Studies comparing lecture and discussion approaches to learning were surveyed by Stovall (50), who found the two techniques to yield about the same results for recall of factual knowledge immediately after learning; however, the discussion approach was favored in practically all other comparisons. Strang (51) reported the findings of studies of the effectiveness of supervised study and homework to be conflicting and inconclusive.

An attempt to link study of literature to the learner's problems and daily experience was a trend noted by Wolfe (57). Morrisett and Hovland (35) compared varieties of training in human problem solving, and thorough treatments of problem solving as a method of instruction were provided by several authors (1, 12, 17). Spence, Melton, and Underwood (48) described the ways in which laws of learning could be applied in the classroom. Corman (9) noted a lack of research into the question of problem solving in the classroom and attributed it to the absence of clear delineation of the significant variables.

Krathwohl (27) called attention to functions of the teacher in facilitating the integration of educational experiences. Capehart (7) and Lurry and Alberty (30) described practices in secondary-school core classes which involved problem solving and integration of learning. Trump (54) stated that a flexible plan of scheduling and grouping in the secondary school will allow appropriate procedures to be adapted by teachers planning and working in teams for shifting patterns of large groups, small discussion groups, and individual study.

Evaluation of Learning

Research concerning evaluation of learning is more limited than research related to other phases of instruction. Studies dealing with psychological and educational testing are reviewed elsewhere in a regular issue of the Review (2). Rothney (44) identified major problem areas and described the sequence of effective procedures in evaluation. Wrightstone, Justman, and Robbins (59) reported trends in evaluative practices which reflect an increasing concern for functional outcomes and the measurement of understandings rather than isolated information, skills, and abili-

ties. Hand (18) and Schwartz, Tiedeman, and Wallace (46) provided suggestions for evaluative procedures in the secondary school. Rothney (34) found practices in reporting pupil progress generally to be confined to the traditional form of report, which he believed inadequate for the promotion of a co-operative home-and-school relationship. Roelfs (33) found a trend toward more varied and informal reporting practices in junior high schools.

Needed Research in Instructional Methods

Fleming (13) and Taba, Noel, and Marsh (52) described action research programs which show promise of narrowing the gap between what is known and what is done: a critical problem for instruction. Pertinent questions in problem solving remain to be investigated, and study of the broader effects of the newer techniques of organization and instruction cited in this review is needed before conclusions can be drawn. The need for a theoretical framework to guide research in the area of methodology is critical for the entire field of education.

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CHAPTER VI

The School Program: Nonclass Experience

MAURICE J. EASH

THIS CHAPTER deals with organized learning experiences held under the auspices of the school but generally not as an integral part of the formal academic curriculum. It discusses the literature and research under three headings: definitions, problems and concerns, trends.

In the five-year interim since the first review of the research and literature on nonclass activities (15) interest has not lessened. General bibliographies (20, 22, 23) appeared, as well as special bibliographies on such aspects as evaluation (11) and policies (70). Most writing on nonclass activities stated objectives and purposes and described programs and opinions. Relatively few carefully controlled research studies investigating selected variables in nonclass activities were done. Research was mainly limited to questionnaires examining one facet of a program or gathering opinions about current programs, and it was subject to the severe limitations of studies based on questionnaires.

Though shedding some light on the current status of nonclass activities, such studies did not help to resolve the major problems. After critically examining a number of studies of nonclass activities, Krumboltz (35) concluded that much has yet to be done to validate objectively many of the values claimed for nonclass activities; conclusive evidence of their value is virtually nonexistent.

Definitions

Confusion as to what constitute class and nonclass activities is reflected in the multiplicity of practices and opinions about scheduling student activities. Urged to give more time to academic subjects, schools are being pressed to differentiate between the more formal curriculum and nonclass activities (8). Here the definition of nonclass activities used in the previous review (15) will be adhered to: ". . . the less formal phases of the school program, usually offered either during an activity or homeroom period or outside class hours, and generally not credited in terms of the usual Carnegie units."

Problems and Concerns

Problems in nonclass activities which received most attention fall under the following subheadings: (a) purposes and objectives, (b) lack of faith

in youth, (c) participation, (d) relation to the curriculum, and (e) faculty interest and support. Major changes appear to be a heightened concern for delineating the relationship of nonclass activities and the more formal curriculum, re-examination of the problems of participation, and a shift of opinion concerning faculty interest and support. Many problems are interrelated, and some overlapping of discussion is unavoidable.

Purposes and Objectives of Activities

Confusion as to what constitute nonclass activities becomes readily apparent in statements of purposes and objectives. These statements frequently conform to the classificatory systems used in listing the objectives of the formal curriculum. A popular taxonomic arrangement includes civic, social, and personal objectives (51, 62, 69).

Where specific objectives were set forth, nonclass activities appeared to be viewed as extensions of the formal curriculum or of other parts of the school program, such as helping to interpret the school program to the public (58), providing enrichment for the gifted (28), and offering vocational opportunities outside the school day (5, 44).

From the statements of purposes and objectives of nonclass activities one might conclude that they duplicate the formal curriculum. Nevertheless, it appears that they are making a distinct contribution to adolescents' education. They offer learning experiences distinguished from the formal curriculum by their flexibility and adaptability to students' interests and needs (5, 6, 28).

Typical lists of objectives and purposes were stated in textbooks written for the field (32, 47). Tompkins (64), analyzing desirable and undesirable policies governing nonclass activities, urged educators to develop programs based upon accepted objectives rather than spending their efforts on disagreements over lists of objectives. As further discussion in this chapter reveals, lack of clarity as to objectives of nonclass activities is one part of a major problem involving lack of faith in youth and faculty support of nonclass activities (2, 25).

Lack of Faith in Youth

The lack of understanding of objectives and purposes of nonclass activities is most clearly demonstrated in terms of the role that students are given. Nonclass activities are justified on the grounds that, through their flexibility, many opportunities can be provided for youth to learn to make choices, render decisions, evaluate consequences; that is, to learn the techniques and attitudes of democratic citizenship (51, 69). The claim is also made that they promote learning of the formal curriculum in settings of greater meaning and significance for students (32, 37). Underexploitation of the learning opportunities of nonclass activities is too frequently the

ease, and when major decisions are involved, adults are overeager to preempt the students' role of choice maker.

Marden (45), studying New Jersey secondary school student councils, found that over 80 percent of the sponsors were appointed by principals. The most democratic method of selection of sponsors (co-operative agreement of students, faculty, and administration) was observed in less than 2 percent of the schools. Righter's study of student councils in selected schools in West Virginia (57) and Fisher's evaluation of student council practices in Connecticut (16) support the belief that the authoritarian selection of sponsors cited above is not a practice peculiar to one section of the country. Thus, rich opportunities for learning democratic responsibility are quickly short-circuited, and such instruments as the student council become lifeless surrogates of the faculty and administration.

Another common practice which inhibits the learning of democratic attitudes is the use of election procedures which disfranchise large groups of students. Voting privileges in some school elections are restricted to members of the general student organization (59). Under these circumstances, adherence to a rule that establishes first- and second-class citizenship is extended to the social-political structure of the school.

Delegating management of funds connected with nonclass activities to students, as a method of reinforcing learnings of the formal curriculum, occurs infrequently. Patrick (52) found few cases in which the student council or student bank had responsibility for bookkeeping and handling of funds for nonclass activities. All too frequently, adult management of nonclass funds was found to nullify students' opportunities to learn and practice fiscal responsibility (14). Hesitancy to entrust youth with deciding how much time should be given to nonclass activities was also observed (37, 39, 68).

What underlies the lack of faith in youth pointed out by this research? A ready-made opportunity for students to practice the managing of time is ignored: arbitrary limitation of the number of nonclass activities in which a student may participate sharply reduces the student's opportunities to capitalize on their educational worth and denies his own budgeting of time. Erickson's study (14) of student decision-making in nonclass activities in a representative sample of Minnesota high schools disclosed some possible explanations. Primary motivations of students to participate in nonclass activities were related rather to community expectations and traditional practices than to objectives and purposes growing out of students' interests and needs. Thus, practices which reflect lack of faith in youth are part of a broader problem of developing an operational statement of purposes and objectives for nonclass activities.

Participation

Encouraging students to participate in nonclass activities has met with almost unanimous approval among educators owing to the belief that there

is a relationship between failure to participate and dropping out of school (38). Amount of time spent in participation, as well as the reasons for nonparticipation, received increased attention. Undoubtedly, concern about the amount of time that students spend in nonclass activities is prompted by increased public demand that more time be spent on the formal curriculum (1).

In cases in which arbitrary limits are established on participation, the maximum number of activities in which a student may participate ranges from one to three (37, 39). The principal reasons given for such limitation are as follows: (a) Overparticipation results in neglect of the academic curriculum. (b) Overscheduling may impair the health of the adolescent who is too ambitious (71).

However, McCaslin (41) found that in three Maryland high schools the majority of actively participating students who were absent from class most frequently in order to attend nonclass activities received higher grades, had higher achievement ratings, and were less often absent from school than those who participated in few nonclass activities. Twining's study (66) produced comparable findings from similar data.

Thus, it would appear that regulating the number of activities in which a student may participate cannot be supported. If the problem appears to be overparticipation, utilization of the school's guidance facilities to help students make wise choices would be a more desirable practice (26).

The important role that guidance assumes in nonclass activities was brought out in a study by Israel (29). In cases in which students planned and executed nonclass activities with a minimum of guidance, Israel found the activities were exorbitant in cost, which limited participation.

Participation is also adversely affected when nonclass activities must be scheduled outside the regular school day (49). Pauley's study (53) of 600 seniors' participation found that distance, transportation, and part-time employment were marked limitations. For these reasons it has been suggested that all nonclass activities take place during the regular school day (34). An added advantage of such an arrangement is that students can be more easily guided into activities which contribute to personality development (46).

The cost of nonclass activities has often been cited as a significant factor affecting student participation (7, 33, 60). Recent investigations of costs are few. Saunders' study (60) of costs in 80 Nebraska high schools showed that students were contributing slightly over 20 percent of the direct support for nonclass activities. Although the contradiction between supposedly free education and educational programs freighted with hidden costs (to which nonclass activities significantly contribute) has long been a popular theme, Israel (29) found that teachers did not believe the cost of nonclass activities important in governing students' participation.

Gordon's study (21) of a high-school social system explored a new dimension of student participation. He found students to be defining social status in terms of participation in nonclass activities. His study

questioned whether devices for cutting fees or scheduling activities during the school day could effectively deal with the problem of nonparticipation. Under present organization, students of low status are excluded from participating (40). Keislar (31) found that certain nonclass activities attract students with similar patterns of behavior, that is, students of comparable status. These studies, especially that of Gordon, emphasize the complexity of the relationship of nonclass activities to total configuration of the school, and it would appear that the fundamental factors influencing participation are only beginning to be explored.

Relation to Curriculum

It was pointed out that scheduling nonclass activities exclusively outside the school day handicaps the program and virtually excludes many students (63). Nevertheless, a variety of attempts to fit nonclass activities into the school day have brought no universally satisfactory solution (13, 48, 65). Scarcity of time in the regular school day compels reappraisal of the total program with a view to correlating class and nonclass offerings. Some natural combinations, such as the school newspaper and instruction in journalism, would easily lend themselves to a correlated program (17, 30).

Students' perceptions of the relationship of nonclass activities to the formal curriculum are important, as well as perception of this relationship by the faculty and administration. More than half of 9000 Indiana high-school students rated nonclass activities as equal in value to the academic subjects (4). Vredevoe (72) believed the program of nonclass activities provided by the secondary school to be a better index of sincerity in teaching democratic values than the formal school program.

Not everyone views the increased acceptance of nonclass activities as an important part of the regular school schedule with equal enthusiasm. Nonclass activities, it is felt, have overloaded teachers who are already heavily burdened, distracted students from applying themselves to the formal curriculum, and received community sanctions and rewards to an extent that downgrades teachers' efforts in the formal curriculum (1, 8). There is probably considerable truth in the assertion that imbalances exist, especially where interscholastic sports are involved (54). That attention is being focused on developing the two programs, nonclass activities and the formal curriculum, as complementary educative forces, rather than as rivals for students' time, is, indeed, a hopeful sign (24).

Faculty Interest and Support

The success of nonclass activities relies heavily upon the genuine interest and support of a school faculty. Faculty support in some schools has been less than wholehearted (59). The conflict between teachers, school admin-

istrators, and school boards over sponsorship of nonclass activities seems to center around the problems of teacher load and extra pay for extra work (3).

Court decisions have fairly well established authority of school boards to assign teachers to nonclass activities as part of their duties when such activities lie within a teacher's field of training and competence and are assigned on a reasonable and nondiscriminatory basis (18, 67). Despite court rulings, the climate of opinion seems to be that extra pay for extra work is justified (55). A nationwide sampling of school administrators revealed that 80 percent are in favor of extra pay for teachers whose duties extend past the regular school day (50).

McClain (42, 43) concluded from a study of policy in 1174 schools that, once the practice of paying for extra work is inaugurated, it will be extended, both in respect to amount and in respect to number of people receiving remuneration. When nonclass activities are viewed as part of the teacher's regular load, the position generally adhered to is that they should take place during the regular school day (10, 34).

A way of securing faculty support is to hire a specialist who will administer the nonclass program and release the faculty from this responsibility (12, 27). A fear, perhaps justified, of hiring specialists in nonclass activities is that, in divorcing the faculty from the nonclass activity program, two curricula competing for students' time may be established (36).

Promising Trends

While vast sums of money are being spent on research in various aspects of the formal curriculum, research on nonclass activities limps along supported almost solely by the interest of dedicated workers; but the gradual accretion of knowledge is producing some changes in the programs of nonclass activities.

Rennicke and Hearn (56), analyzing writings on school activities, cited the following trends: (a) the conscious effort to relate the objectives of nonclass activities to the general objectives of education; (b) increased attention to the problems of overparticipation and underparticipation; (c) attempts to solve problems of imbalance, whereby some activities were overemphasized to the detriment of the remainder of the program; (d) broadened student participation in school government and more shared responsibility between students and school management; (e) viewing of nonclass activities as part of the teacher's regular load, and not as an adjunct of the formal curriculum.

Another discernible trend is the linking of nonclass activities to projects sponsored by local community and civic clubs. Students are provided opportunity to assist Community Chest drives and other socially useful projects. One outcome of these co-operative efforts was better community understanding of the nonclass activities of the school (19, 61).

Some recent reappraisals of how youth are spending their time in school seem to reflect a concern with evaluation of nonclass activities and with a need for means to present a program of defensible activities to the public (9). That evaluation of nonclass activities has been grossly neglected is readily apparent (35). Crum (11) listed a series of instruments which can enable educators to appraise more accurately the efficacy of nonclass activities in achieving desired objectives. A major weakness in evaluation has been a lack of attempts to measure the contributions of nonclass activities, and/or use of only the most limited measuring instruments. Public pressures causing educators to re-examine the total concept of nonclass activities may well be a major stimulus to improving nonclass programs.

A program of nonclass activities to complement the formal curriculum is more imperative than ever. In an age of anxiety, adolescents search for a social organization which admits of personality expression. Nonclass activities properly conducted can provide a socially acceptable organization for youth to meet these basic psychological needs. Additional research is needed in all areas of nonschool activities to strengthen the present programs and build guidelines for co-ordinating nonclass activities with the other educational opportunities provided by the schools.

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CHAPTER VII

The School Program: Organization and Staff

GLENN R. SNIDER

DURING THE last five years the broad concept of needs, which dominated educational purpose and action in the preceding decade, yielded to the persistent demand for greater stress on challenging the adolescent intellect. Lack of studies to measure the relative effectiveness of different organizational arrangements, however, was noticeable during the period under review.

The Association for Supervision and Curriculum Development (6) attempted to identify and propose alternative solutions to some of the major theoretical issues and problems, frankly making the analysis in the progressive-experimentalist context. The 1958 Yearbook (4) of the American Association of School Administrators indicated the future role of the secondary school and pointed out that its pattern of organization had been in a state of flux for some time. This study found many dissatisfactions with inherited organizational patterns to stem from desire to improve curriculum and educational services, utilize instructional staff more effectively, and improve articulation and co-ordination.

Conant (26), analyzing weaknesses and strengths of the secondary school, saw the comprehensive high school as able to meet the nation's educational needs, but, at the same time saw absence of adequate secondary-school programs in thousands of American communities unless effective school-district reorganization occurs. Wiles and Patterson (122) likewise believed any high school other than the comprehensive high school incompatible with basic American democratic values.

A review of research in the areas covered by this chapter will overlap sections in other REVIEW issues dealing with instructional improvement, curriculum change, general administration and organization, higher education, and teacher education. The reader seeking more information may wish to consult REVIEWS under these topics. The treatment of this chapter follows that set by the last previous chapter on the topic. The first part of this chapter deals with major aspects of organization: the junior high school, the senior high school, the junior college, articulation between the secondary school and other educational organizations, and utilization of staff. The second part is concerned with staff problems in the secondary school: the secondary principalship, teacher supply, qualifications for admission to teaching, problems and deficiencies of beginning teachers, employment conditions, problems of staff morale, and qualities of an effective teacher.

Organization

The Junior High School

The junior high school became more firmly established in the educational framework. Gaumnitz and others (45) focused attention on problems, provided useful data, and perceived the junior high school's place now rightly recognized.

Douglass (33) detected a trend toward the 6-3-3 school organization and revealed that almost half the students in grades 7 through 9 were enrolled in junior high schools, 16 to 18 percent in six-year schools, and 30 to 35 percent in systems having 8-4 plans of organization. Seventy-five percent of junior high schools were housed in separate buildings, and more than 80 percent had their own principals. Douglass also saw a trend toward larger classes, longer periods, decrease in study halls, and increase in core periods, and the replacing of authoritarian with co-operative procedures.

The U. S. Office of Education (45) also found separation of junior and senior high schools predominant in terms of the number of pupils served. The next most frequent plan, however, was the junior-senior secondary school, the four-year high school being least frequent.

A status study (30) of the administrative organization of New York State junior high schools showed a pupil-administrator ratio of 365:1. Principal opinion in the same study set the optimum ratio, however, at 200:1 or 250:1. Regardless of size of school and adequacy of staff, basic functions were not being delegated. Marsh (69) discussed recent trends in organization and administration and identified 10 specific tendencies. He predicted that the junior high school would become the model for the educational system in the years ahead.

The Southern Association of Colleges and Secondary Schools (2) recommended that a junior high school of 720 pupils have a full-time principal, a curriculum or administrative assistant, a full-time materials consultant, a full-time guidance counselor, a full-time school nurse, and adequate secretarial, clerical, and managerial help. Gruhn and Douglass (50) proposed a similar staff, but additional staff to deal with counseling and curriculum direction.

Baughman (11) reported a study of the Illinois Junior High School Principals Association which examined the duties and functions of junior high-school principals and found junior high schools lacking adequate staff mainly in the field of supervision and curriculum improvement.

Tomkins (110) conducted a questionnaire study sponsored by the National Association of Secondary-School Principals and reported that fewer than 3 percent of the 1236 schools which responded were on double session. Of those responding, 84.7 percent were three-year junior high schools, and the average enrollment was 675. Of the responding schools,

71 percent had 500 pupils or more, and 6 percent had over 1000. Block time classes were reported by 57.3 percent. The most comprehensive study of block time classes was made by Wright (123).

Gammitz (44), observing trends toward reducing number of periods, lengthening periods, and lengthening the school day, formulated nine conclusions and recommendations.

The Senior High School

As in the previous decade, significant studies of the enrollment and organization of good senior high schools were completed during this review period.

The President's Committee for the White House Conference on Education (91) proposed that every four-year high school have a minimum of 300 pupils, or of 75 pupils in each age group, and 12 full-time teachers. The Educational Policies Commission (30) in 1959 recommended school districts large enough to support efficiently at least one high school having a varied, individualized program through the twelfth year. Five hundred or more students would be needed in a four-year high school to effectively use such offerings.

Conant (26) contended that in many states the task facing education is elimination of the small high school through appropriate district reorganization. According to his recommendation that there should be at least 100 pupils in a graduating class, over 70 percent of the nation's high schools are too small.

Shapiro (102), surveying 17 four-year high schools in California with enrollments of more than 800, sought to determine the relationships between school size and curricular offerings, guidance, staff relations, and school-community relations; he concluded that the optimum size for good staff relations is an enrollment of 1200 to 1600, but that the advantages are not sufficient to warrant major sacrifices to achieve that size.

The trend since 1931 away from the 8-4 organization was noted by Clevenger (25) to be more pronounced in some states than in others. Grady (48), analyzing administrative practices in large six-year high schools of the North Central Association, interpreted single administrative use of building and elimination of graduation exercises for the lower grades as evidence of single-unit operation. Evidence indicated, however, that in assignment of teachers, activity participation, enrollment procedures, accrediting, and rules and regulations, the schools were being administered as double units, as both junior and senior high schools.

Conant (26) suggested organizing the school day into seven or eight periods in order to provide opportunity for talented students to elect courses as additions to the basic academic program. Wiles and Patterson (122) contended that more experimentation must be done with present schedules and thought 40- to 50-minute periods likely to be inadequate for some activities and classes.

Forsheit (41) cited disadvantages of double sessions and suggested a plan of scheduling in overcrowded schools which used a more common school-day length. Reitsbroeder (93) analyzed the extended school year program and recommended that it be considered an integral part of the total program. Carper (19) described an extensive summer school program in Iowa.

The "House Plan," a new concept in secondary-school organization, was described by Fitts (40) as it operated in two Connecticut high schools. The arrangement combined advantages of the large comprehensive school with those of the small school. Students, identified with the house to which they were assigned, shared the general facilities.

Articulation

Articulation has been defined as the relationship of the various organizational parts of the educational program and the facility with which transition occurs among these parts. Articulation problems may relate to administrative practice, pupil guidance, approach in teaching, or the curriculum.

A definitive analysis of the articulation problem in the past decade appeared in the 1958 Yearbook (5) of the Association for Supervision and Curriculum Development. This comprehensive treatment dealt with both vertical and horizontal aspects of articulation and critically evaluated current efforts at solving articulation problems on the basis of criteria of articulation and continuity of learning.

Jones (61), discussing articulation between elementary and secondary schools, saw need for identification of threads of continuity, persistent themes, and central ideas characterizing areas of instruction. He drew on an important study (79) emphasizing the significance of these factors in the improvement of mathematics instruction in terms of the movement of children from one level to another.

Swenson (108) believed that solutions of articulation problems must be sought through consideration of educational objectives, child growth, learning, and curriculum development. Smith (105) saw satisfactory articulation between the elementary school and the junior high school as a goal to be achieved by means of more effective supervision.

Hodge (55) related how a plan for improvement of articulation between elementary and secondary schools was expanded into a K-12 program. Schwartz (97), explaining articulation in a Los Angeles junior high school, saw the change from elementary school to junior high as the biggest event in a pupil's life after the first day of school.

A timely treatment of the implications for secondary education of the Carnegie unit and its relationship to the problems of articulation from level to level in the secondary school was made by Tompkins and Gaumnitz (111).

Michael (71) believed discontinuity of curriculum content to be one of the chief problems in the transition from junior to senior high school. He described the way one school dealt with this problem through 12 articulation committees in as many subject fields that dealt with problems of curriculum structure, scope, placement, instructional material, and teaching methods at each grade level. Michael saw need for close collaboration between high schools and colleges in definition of tasks, responsibilities, programs, and services. He perceived improved teaching of academic subjects as important to articulation and he referred to the Advanced Placement Program as promising, indicating an instance in which it had worked satisfactorily. Bodd (17), studying co-operation between high schools and colleges, found only 14 of 164 respondents aware of efforts to improve relations. Improving the transitional period, co-ordinating curriculum, and determining more clearly who should go to college were most frequently listed as problems. Morrison (74) described efforts of community junior colleges to remove unnecessary hurdles between high school and junior college in an attempt to develop a smooth transition and insisted that articulation between the two programs is a relatively simple matter.

Dudley (34) described the Advanced Placement Program as imaginative and as a new direction in educational growth, and Keller (62) traced its history. Others (12, 18, 38, 119) described the functioning of advanced placement programs in specific secondary schools.

Staff Utilization

A significant development was increased interest and experimental activity in utilization of the secondary-school staff. Momentum was provided by the formation of the National Association of Secondary-School Principals' Commission on the Experimental Study of the Utilization of the Staff in the Secondary School, financed by the Ford Foundation.

Trump (115) formulated 10 basic questions about staff utilization, which should engage the attention of educational groups, agencies, and schools faced with the problem of inadequate professional staff. The same writer also summarized staff utilization studies apropos of (a) television education, (b) student grouping, (c) teaching assistants, (d) assignment of staff and scheduling, and (e) curricular revision, evaluation, and in-service growth. Trump's description of the San Angelo, Texas, schools included interesting approaches to better staff utilization through the use of teaching consultants, flexible scheduling, year-round use of functionally designed school buildings, and the development of distinct levels of instruction throughout the school. In the same report, Trump called attention to a national program in the use of television in the public schools in eight major cities, two counties, and three states.

Mitchell (72) reported specific advantages demonstrated by an experiment in closed-circuit television in the Evanston, Illinois, Township High

School, and he noted utilization of a team approach to teaching, distribution of the talents of good teachers, and improvement of in-service preparation of teachers as positive contributions. Brock, Jarecke, and Yost (16) described a controlled experiment in which bus drivers served as teacher assistants in driver education. A state-wide approach to the study of effects of utilization of junior high-school evaluative criteria and core programs was analyzed by Wyatt, Ball, and Winget (124).

Gaffney (43) contended that schools should undertake a structural reorganization permitting the formation of teaching teams composed of a leader, career teachers, subject specialists, several young, inexperienced teachers, and members of the community who are capable of contributing effectively.

Trump (114) listed needed staff utilization studies under the following headings: (a) utilization of teaching assistants working with professionally competent teachers, (b) reorganization of administrative patterns, (c) recognition of student responsibility for learning, (d) analysis of teacher roles and competencies, (e) utilization of material aids to instruction, (f) utilization of physical plant, (g) staff utilization through curriculum revision, and (h) interesting able young people in teaching.

Reporting for the National Commission on the Experimental Study of the Utilization of the Staff in the Secondary School, Trump (113), prompted by the teacher shortage, saw the future secondary school as organized around large-group instruction, individual study, and small-group discussion. Such organization would call for fewer professional staff members, who, however, would presumably earn higher salaries. Park (87) reported on the Bay City experiment designed to free professional teachers from the many "non-essential" tasks which occupy 60 percent of their time.

Staff Problems

Effort increased to improve personnel policies. The relationship between development of sound policies affecting the welfare of teachers and the available teacher supply was recognized by the National Commission on Teacher Education and Professional Standards (82) at its 1957 national convention.

The Secondary-School Principalship

The movement to professionalize the secondary-school principalship progressed. Morrison (75) investigated processes of selection, chiefly in Ohio. White (120) examined bases for systematic recruitment and selection and recommended a procedure. Peterson (89) sought a relationship between an administrator's performance on one or all of six tests and evaluation of his performance as measured by an evaluation instrument.

Manney (68) concluded that junior high-school principals are not well prepared, that certification requirements in most states are not high enough to affect their preparation significantly, and that more attention should be given to personal characteristics in preservice programs. Seay (99), reporting on the Kellogg-sponsored Cooperative Program in Educational Administration, saw the preservice program of the future as a broad, basic program postponing more technical courses, and the in-service program as emphasizing research problems and functional activities for inadequately prepared administrators.

Development of certification requirements for administrators was traced by Howsam and Morphet (57, 58), who found two-thirds of the states to require a master's degree for certification as a secondary-school principal in 1957. They formulated 21 recommendations for development of certificate programs for administrators.

McAbee (65), studying principals in Oregon, concluded that the most important function of the secondary-school principalship was supervision and instructional improvement, whereas an important New York State study (29) defined the secondary-school principalship as a high-level professional position in the school's organization, with the chief responsibilities for improving the educational program, selecting and developing personnel, working with the community, and managing the school.

Clarke (24) identified critical requirements for the principalship as viewed by New York City teachers. Shaffer (101) studied the role of the principal as supervisor of instruction and discovered that routine management duties often prevent discharge of this responsibility. Holden (56) revealed that teachers and principals differ significantly in their conceptions of the principal's role. Cooper (27), using the critical incident technique developed by Flanagan and others, found the principal least effective in the area of professional standards of conduct and in leadership.

Wiles and Grobman (121) contended that a school evolves the most productive learning situation under democratic leadership and maintained that a close relationship exists between actions classified as democratic and those considered best practice. A review of a study by Sharma (1) indicated that teachers want to assume responsibility for instruction, desire more autonomy for their individual schools, and point out how practices fall short of what they desire themselves. Teachers with more-than-average academic preparation tend to be more critical of administrative leadership than the teacher with average preparation.

Healy (54), exploring leadership techniques, found that half the responding principals had never used 13 of the techniques about which they were questioned. Moyer (77) investigated the kind of leadership teachers desire. Moser (76) identified leadership styles of school administrators, analyzing the leadership expectations which principals and superintendents have of one another.

New York secondary-school teachers, according to Clark (22), regarded the principal's relationships with teachers as the most important

area of his responsibility. Alpren (3) found secondary school teachers better able to describe the behavior of their principals than the principals themselves. Waite (113), examining personal characteristics, discovered apparent inherent latent conflict in teacher-principal relationship and concluded that group loyalty is not automatically accorded to the official leader but must be earned before he can operate effectively in the capacity of leader.

Schultze (90) explored communication between administrators and teachers. McCleary (66), studying the relationship of interpersonal influence within a school staff to communication, found interpersonal relationships of staff members affected the operation of the school in many important ways. Goodwin (47) attempted to discover differences between the frequency of teacher activities in schools having relatively democratic principals and those having relatively authoritarian principals. Seltzer (100) analyzed human relations in secondary school administration through a study of 50 episodes in administrative practice.

Tillard (103) explored the duties and responsibilities of the assistant principal. He found a need for clearer definition of the position. He recommended that assistant principals have the same professional training as principals and be relieved of teaching responsibilities in schools with enrollments of 700 or more. Bolden (13) studied the assistant principalship in 11 selected American cities. Brandes (15) and Jarrett (59) both saw need for clarifying the role, duties, and responsibilities of the subordinate secondary-school administrator.

Teacher Supply

The educational potential of the American secondary school is heavily dependent upon the sources of supply of competent teachers and other professional personnel. The National Education Association (86) reported in 1959 that one-fourth of those qualifying for teaching certificates did not enter the teaching profession and estimated that the teacher shortage by September of that year would be 135,000. The imbalance resulting from fulfilling the needs of elementary schools to a less degree than those of secondary schools was expected to increase; there was some prospect that more high-school teachers would be available in the fields of greatest shortage. This same report gave the number of new secondary-school teachers in 1959 as 78,220—more than 13 percent increase over 1958, but a decrease of 10 percent from 1950. Fewer teachers were prepared in every major subject area in 1959 than in 1950, except in art and mathematics, but most encouraging were the increases over 1958 in mathematics, science, and foreign-langauge teachers of 37 percent, 28 percent, and 23 percent, respectively.

A similar study by the National Education Association (84) in 1957 defined "demand": (a) a number of new teachers equal to the total

number who quit at the end of the preceding year; (b) new teachers to relieve overcrowded classrooms; (c) new teachers to meet increased enrollment; (d) new teachers to offer essential instruction and educational services not now provided; and (e) new teachers to replace the least competent.

Harper (57), attempting to determine why certified teachers do not enter the profession, found no relevant difference in traits among those who taught and those who did not teach after graduation. Dietrich (66) and Harris (62) studied factors which caused teachers to leave the profession in 1957. Both listed as leading factors economic conditions, working conditions, and dissatisfaction with teaching; incompetent administrators and inadequate school boards were also mentioned as causes of teachers' leaving the profession.

The U.S. Office of Education (117) reported efforts to increase the teacher supply: (a) action to raise salaries, (b) scholarships, (c) recruitment of former teachers, (d) special training programs, (e) issuance of temporary teaching certificates, (f) use of teachers' aides, and (g) use of audio-visual aids, including television.

Qualifications for Admission to Teaching

Encouraging for improvement of teaching and the quality of education in general was the persistent movement toward professionalization. Schloss and Hobson (95) observed that, for regular high school certificates, 44 states required the bachelor's degree, three states required the master's degree or its equivalent, and one state required two years of college. Forty-one states also required the recommendation of the college or employer. The same study called attention to the sobering fact that 92,300 full-time teachers were teaching on substandard certificates—an increase of 0.9 percent over the number of teachers having substandard certificates in the fall of 1957.

The National Commission on Teacher Education and Professional Standards (81) reported that universities, general colleges, and teachers colleges, in that order, produced the most 1958 graduates certified to teach in secondary schools; 63.3 percent of all persons certificated at the secondary-school level came from institutions accredited by NCATE. The U.S. Office of Education (117) reported in 1959 that 44 percent of the nation's secondary-school teachers held the master's degree and that the number is increasing.

Qualification for teaching in the junior high school was a subject under keen discussion, but there was little evidence to indicate that any substantial number of teacher "preparatory institutions prepare teachers" specifically for work at this level (2). Harvey (53) pointed out weaknesses in the educational preparation of those who teach in junior high school.

Problems and Deficiencies of Beginning Teachers

Employment of teachers with substandard certificates added to problems faced by school administrators at both elementary and secondary levels.

Scheller (94) found that new teachers believed their induction could have been more adequate, that they received most help from other teachers, and that control and motivation of pupils and providing for individual differences gave them most difficulty. Their greatest weakness was failure to provide a stimulating atmosphere in the classroom. Schwarz (98) discovered that beginning teachers' problems fell mostly into the areas of (a) human relations, (b) self-adjustment, and (c) desire for more teaching skill, in that order.

Cross (31), analyzing difficulties and effectiveness of beginning teachers who taught both in and out of their fields of preparation, concluded that problems were increased when they taught out of their fields of preparation and that beginning teachers are required to teach too many different combinations of subjects.

Several studies were conducted relative to programs and procedures for orientation of new teachers. Strickland (106) found that most superintendents and new teachers believed orientation programs necessary, but only 37 percent of Ohio schools provided such programs. Major program weaknesses were (a) lack of organization in small schools, (b) lack of consultation with teachers, and (c) failure to provide early assistance.

Elliott (37) reported that both administrators and teachers of St. Louis listed maintenance of good discipline and adjustment to school routine and policies as major problems. Chalquist (20) examined orientation procedures in large city school systems and made 14 conclusions and recommendations. Ferguson and Rouse (39) analyzed principal-teacher relations in the orientation program in Atlantic City.

The U.S. Office of Education (70) reported that secondary-school beginning teachers were more likely to leave teaching during the first five years than elementary-school beginning teachers and that teachers of nonacademic subjects were most likely to leave within five years. Gaumnitz (44) believed it highly important that beginning junior high-school teachers not be assigned greater than normal duties.

Employment Conditions

As the profession acquired increased status in a market characterized by continued shortage, more attention was paid to job conditions. The Research Division of the National Education Association (85) reported that the average salary of instructional staff increased from $2846 in 1948-49 to $4935 in 1958-59, an increase of 4 to 5 percent over the pre-

ceding year and an increase of 24 percent during the 10-year period. The average salary of classroom teachers in 1958–59 was $4,775, $740 less than the figure for total instructional staff. The U. S. Office of Education (117) reported that 51 percent of public secondary school teachers are women, the proportion of men having increased slightly in recent years.

Shaw (103) found that men teachers were more likely to receive additional compensation for activity assignments than women teachers and that excesses and inequalities in load may have been due to inability, unwillingness, or reluctance of schools to acquire an adequate staff.

Clark (23) compared various formulas for calculating teaching load, concluded that all possessed weaknesses, and believed the most successful formula to be one in which allowances for various factors are agreed upon by local teachers.

The most controversial issue with regard to employment conditions was merit pay or rating in relation to salary earned. A comprehensive account of merit rating appeared in the *Bulletin of the National Association of Secondary-School Principals* (78). The *Journal of Teacher Education* (83) devoted an issue to the problem of merit pay. Tompkins and Roe (112) summarized the *pros* and *cons* of merit rating plans.

McKinley's questionnaire study (67) found 20 percent of 140 systems using merit pay plans of five different types. He urged teachers' participation in planning and evaluation. Peterson (88) suggested creation of two merit salary schedules, one for "satisfactory teachers" and the other for "outstanding teachers." He indicated that most teachers would favor a merit plan once they were assured a decent standard of living. Ralston (92) found that 97 percent of 151 teachers in 20 states believed that an identifiable difference in teaching ability exists and that teachers as a group, or teachers with administrators, could identify it.

Problems of Staff Morale

A New York State study (28) produced a scorecard for appraising administrative morale. Distinct differences were found in the perceptions of administrators concerning the various factors causing low and high morale in schools. Barry (10), studying morale among administrative staffs, was able to relate high morale to specific factors.

Bowman (14) found both agreement and disagreement between teachers' and administrators' opinions on personnel administration practices. Silverman (104), reporting a survey among New York City teachers to discover the personal characteristics and daily activities of principals which might affect teacher morale, discovered concern with need to achieve security and indicated that a principal's personality and personal relations had more effect on teacher morale than his professional qualifications and other personal characteristics. Linder (64) identified 20 factors

leading to poor morale. 10 from the viewpoint of the teacher and 10 from that of the principal. Basic to all 20 was the lack of appreciation of the difficulties of one anothers' jobs by teachers and principals.

August (7), comparing administrators' beliefs concerning job expectations of experienced teachers with expectations reported by the teachers themselves, concluded that superintendents are more concerned with costs than with teaching, whereas teachers are much more concerned with professional matters than with finances of the school. Factors influencing the work of teachers in Virginia were pursued by Morford (73), who found that heavy teaching loads, no free periods, and excessive nonprofessional or clerical chores contributed substantially to low morale.

Dunn (36) ascertained that major reasons for teachers' leaving the profession, except for homemaking, were poor tenure provisions and inadequate salaries. A Texas study (109) described major reasons as: (a) inadequate salary, (b) inadequate increments, (c) excessively heavy teaching load, (d) too many meetings, and (e) too much out-of-class work. Chandler (21) concluded that, although salary is an important matter, high morale results from a multitude of interrelated variables.

Qualities of the Effective Teacher

The 1940 summary by Barr (8) of approaches of 138 investigations related to the prediction of "teaching efficiency" is yet apropos. Fulkerson (42) reviewed research dealing with teacher characteristics, competencies, and effectiveness.

Johnson (60) listed steps to develop an experimental technique for the prediction of teacher effectiveness. Barr (9) isolated problems associated with the measurement and prediction of teacher success. Goldin (46), using the critical-incident method, analyzed behaviors related to effective teaching and reported 102 critical requirements, of which those behaviors relating to classroom instruction and individual attention to pupils and guidance were most numerous.

Dugan (35) investigated some selected personal factors in effective teaching by means of a questionnaire validated to measure egocentricity and mental objectivity of the teacher. Critical elements in teacher effectiveness were studied by Pisaro (90). Suggs (107), examining persistent problems of teachers, detected four major factors related to prevention or solution of isolated problems: (a) community attitudes and resources, (b) administrative practices and procedures, (c) preparatory programs for teachers, and (d) teacher attitudes.

Griffith (49) compared dismissed and reappointed teachers. He ascertained that the major factor in dismissal was inability to control pupils and found teachers more likely to be dismissed in small schools. Administrators tended to avoid making clear-cut suggestions to teachers in danger of dismissal and distinguished dismissed from reappointed teachers in an over-all sense better than in terms of specific characteristics.

Problems for Further Study: Needed Approaches

The current widespread concern for improvement of secondary school programs is not likely to subside. The matter of improved articulation, particularly between schools and colleges, should receive close attention, and expected changes in the high-school curriculum and services should be accompanied by corresponding changes at higher levels. Responsibility of colleges and universities should be reflected in experimental activity by them aimed at program improvement.

Staff utilization studies should be aimed jointly at further professionalization of teaching and more careful definition of the instructional responsibility of the school. Efforts at improved staff utilization involving such aids as television instruction should not be allowed to perpetuate unjustifiably small high schools.

A bold approach is required if a significant breakthrough is to occur in organization, and careful study should be made of those systems which are experimenting with "levels," or "rail" programs, and other approaches which show promise. Experimentation is needed in the developing of organizational patterns in junior and senior high schools which will facilitate and expedite the evolution of challenging programs, instructional procedures, and pupil services.

The contribution of the educational specialist to the secondary-school program needs additional study, and further research is needed relating to the professional and nonprofessional responsibilities of the teacher. Teachers are not likely to acquire the professional prestige and status enjoyed by members of other professions until such time as their efforts can be devoted almost exclusively to tasks which utilize their professional competency.

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CHAPTER VIII

Needed Research

HENRY R. ANGELINO

THE MATERIALS of the preceding chapters point up the ever-present need for both quantitative and qualitative research in education. Many current articles are merely descriptive and informational. The number of hard-core research projects is small.

All aspects of the adolescent—his characteristics, development, behavior, and education—need careful and thorough analysis. But the emphasis should shift to correspond with the rapid changes in our society. In general, we know too little about the adolescent himself what he thinks, why he behaves as he does, and why his peers so often exert more influence over him than his parents or other adults. In the social and emotional aspects of his development we are even further behind; much of our information is out of date. We are in need of a sound theoretical framework of adolescent development.

The adolescent as a phenomenon is not peculiarly American. European countries and many other nations, particularly those which are rapidly becoming industrialized and urbanized, are experiencing problems similar to those we deal with. A major task is to determine what to do with the ever-increasing number of adolescents. The global explosion of population presents many problems, some of which were previously nonexistent.

In the educational sphere we see that one of our major tasks is to motivate these youngsters, particularly the more able, to continue their education beyond high school. At long last, thanks to scientific rivalry with Russia, adequate education of the academically talented has commanded thought and action. But we are not all in agreement as to the best ways to educate rapid learners or to motivate them to fulfill their capacities. Underachievement is a persistent phenomenon.

Concurrent with this problem is the greater one of who shall teach them. Shall it be a specially prepared person, or the regular classroom teacher? Is the regular classroom teacher qualified and capable to teach the gifted? The numerous published papers about the gifted have barely gone into the question of preparation of teachers. They have been too concerned with methods and techniques to deal with that really important factor, the teacher himself. Much discussion of the values of enrichment has been hortatory and unsupported by experimentation. Does this paucity of information on *who* shall teach the gifted result from an assumption that the current crop of teachers, without special training, is capable of doing the job? Rather, does not teaching the gifted require knowledge and skills beyond those learned in current teacher-training programs? And do we not have "special education," backed by state aid, all over the

country, for teachers of the physically and mentally handicapped, while "special education" for teachers of the gifted is virtually unheard of? Here is an area wherein researchers can spend their time most profitably.

The persistent demands for the comprehensive (dual-purpose) high school, with both general and vocational programs, need study and evaluation. Can the comprehensive high school provide the best form of education for our youth? If so, how best may this be effected?

In the area of curriculum and instruction a number of matters require attention. Instruction procedures, not only for the gifted, but for all youth, need more research. Grouping and other instructional procedures should be investigated by means of more sophisticated experimental designs. Audio-visual instruction, especially television, must be studied more precisely, as many facets of television instruction have a bearing on the over-all problem of teaching and learning. Curriculum content and organization in all areas would benefit by more research. At the national level, more concern should be shown for the changes and shifts in enrollments taking place in the subject areas and in the specific courses. Except in mathematics and science, little pertinent investigation has been accomplished.

Is the core program adequate? One contributor maintains that there is considerable discrepancy between the attention given the core program in the literature and its actual growth in the schools. Why? Little experimental research is being reported in the social studies. Is this because it is too difficult, or because there is little interest?

There are few carefully conceived studies of nonclass experience. How much nonclass experience is desirable? The claimed values of such activities ought to be validated experimentally. How many students do not engage in these activities and why? What about costs? Time is ripe for a reappraisal of the relationship between nonclass activities and the more formal curriculum.

Another problem is that of the proper utilization of staff. Teacher responsibility, both professional and nonprofessional, is in need of reappraisal.

There is need for improving programs at the secondary-school level. How may articulation between high school and college best be effected? What utilization should be made of community resources, both material and human? How important and adequate are extracurricular potentials, such as the Joe Berg Foundation (1, 2), in helping solve the gifted student's problems of depth enrichment in the sciences and humanities? Should we have more of this kind of encouragement for nonclass intellectual activities?

Education requires many kinds of research. Validating research should be fostered. It is necessary that we continuously test current hypotheses, as well as seek new ones. In certain areas, experimental research is almost nonexistent and should be encouraged. Public-school teachers are capable of participating in research projects involving their own classes or the

entire school. They can manage, or be taught to manage, sophisticated experimental designs as well as anyone else. There is no reason why inferior studies should be passed off as research.

Finally—and this is true for the entire field of education—we need a solid, theoretical framework of principles to guide us in research in all dimensions: methodology, techniques of instruction, and human behavior. Some of the studies reported seem to point to attempts to develop theoretical frameworks for our discipline.

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Index to Volume XXX, No. 1

Page citations are made to single pages; these are often the beginning of a chapter, section, or running discussion dealing with the topic.

Academic achievement: and participation in nonclass activities, 60
Academically talented: education of, 34; goals for educating, 31; instruction of, 49
Action research: description of, 53
Adolescence: subculture or developmental phase, 5; theories of, 23
Adolescent: needed research on, 86; opinions of, 17; plans, realism of, 18; problems of, 17; reference groups of, 5; society of, 5; textbooks on, 13; value patterns of, 24; values of, 17; vocational aspirations of, 18; vocational interests of, 18
Adult roles: adolescent view of, 6
Advanced placement: of gifted students, 35; program, description of, 71
Aims: of secondary education, 23
Algebra: coordination of, with analytic geometry, 40
American history: objectives of, 25
Articulation: of educational program, 70
Associations: voluntary, of teen-agers, 9
Athletic honors: and future leadership, 18
Audio-visual equipment: use of, 51
Authoritarian homes: and large families, 14

Business education: curriculum in secondary schools, 37

California Psychological Inventory: and adolescents' self-reports, 16
Carnegie unit: discussion of, 70
Certificates: substandard, number of, 75
Certification requirements: of junior high-school principals, 73; of teachers, 75
Citizenship education: through nonclass activities, 58
Class organization: discussion of, 49
Climatic variations: resultant child growth, 13
Cliques: formation of, 9
Clothing: attitudes toward, 6
College attendance: expectancies of adolescents for, 18
College preparation: high-school responsibility for, 30
Comprehensive high school: discussion of, 67; strength of, 25; task of, 30
Community-adolescent interaction: discussion of, 8
Conformity: to group values, 24
Consensus studies: and aims of secondary education, 29
Core curriculum: content of, 35; nature of, 38; organization of, 39; status of, 38
Cost: of nonclass activities, 60
Counseling: teen-agers' desire for, 6
Curriculum, secondary school: effect of college faculty on, 28; nature of, 34; organizational problems of, of large schools, 36; relation of nonclass activities to, 61

Dating pattern: and family position, 16
Decision-making: as an aim of high school, 26; student, in nonclass activity, 59
Democratic leadership: and productivity, 73
Democracy: teaching of, by nonclass activities, 58
Developmental tasks: research on, 18
Distributive education: programs in, 39
Drop-outs: factors contributing to, 16; and nonclass activities, 60

Educational change: conditions for, 23
Educational objectives: classification of, 26, 27; determiners of, 28; of nonclass activities, 58
Elective choices: of able students in high school, 26
Elementary school: articulation with secondary, 70
Employment conditions: of secondary-school teachers, 76

English instruction: goals of, 29
Ethnic environments: effect on personality, 15
Evaluation: of learning, trends in, 52; of nonclass activities, 63; of teacher success, 78
Extracurricular activities: discussion of, 57

Faculty support: of nonclass activities, 61
Family norms: importance of, 6
Family relationships: of adolescents, 7, 14
Father-daughter relationship: investigation of, 7
Funds: management of nonclass, 59

General education: goals of, in secondary education, 25; science courses, growth of, 36
Gifted: education of, 34; goals for educating, 31; instruction of, 49, 52; views on growing up of, 6
Goals of secondary education: discussion of, 23; comprehensive list of, 25
Goodenough Draw-a-Man Test: and Indian youth, 14
Graduation requirements: of states, 36
Grouping, ability: effects of, 49
Growth: of adolescents, 13
Guidance: in nonclass activities, 60

Housing: of junior high schools, 68

Instructional procedures: in secondary school, 49
Integration: of educational experiences, 52
Intellectual component: increased emphasis on, in high school, 30
Intelligence: and behavior control, 14; growth of, 14; of Indian youth, 14
Intercultural experience: effect on attitudes, 17

Junior high school: organization and staff of, 68; housing of, 68
Juvenile delinquency: as a subculture, 8
Juvenile delinquents: attitudes toward legal authorities, 6; curriculum organization for, 35

Language study: stress on, 28
Laymen: influence of, on secondary education, 28
Leadership techniques: of principals, 73
Learning: applied to classroom, 52; evaluation of, 52; guidance of, 50; laws of, 52
Lecture and discussion: studies comparing, 52

Maladjusted children: and domineering father, 15
Marriage: high-school, 7
Mathematics: high-school enrollment in, 37; high-school programs in, 40; instruction, improvement of, 70
Mental development: of adolescents, 14
Mental health: effect of instruction in high school on, 50
Merit pay: discussion of, 77
Metabolic rate: and growth rate, 13
Minnesota Multiphasic Personality Inventory: and early marriage, 7
Mooney Problem Check List: and early marriages, 7
Morale: discussion of staff, 77
Mother-daughter relationship: investigation of, 7
Motion pictures: use in teaching physics, 51
Motivation: theory of, 49
Music: objectives of, 25

Nonclass activities: cost of, 60; discussion of, 57

Obesity: causes of, 14
Objectives: sources of, 23; of secondary education, 23
Occupational aspiration: of adolescents, 18; and socioeconomic class, 10, 17
Organization: of secondary school, 34, 67
Orientation: of new teachers, 76

Parents: attitude of adolescents toward, 6; relationship to adolescents, 7, 15
Participation: in nonclass activities, 60; limits on, in nonclass activities, 60
Patriotism: school emphasis on, 24
Pay: extra, for extra work of teachers, 62
Peer groups: effect on feminine role, 6

Peer-relations: adolescent, 8
Perception: of adult society by adolescents, 6
Physical acceleration: and psychological adjustment, 15
Physical development: of adolescents, 13
Physical retardation: and psychological adjustment, 15
Physics: college-preparatory, 41; teaching, by film, 51
Principalship: of secondary school, 72
Problem-solving: approach in teaching chemistry, 41; studies of, 52
Problems inventory: factor analysis of, 16
Professionalization: of secondary-school principalship, 72; of teachers, 75
Progressive Matrices Test: and Indian youth, 14
Puberty: and mother-daughter tension, 7

Radio: impact on adolescents, 5
Reference groups: of adolescents, 5
Reflective thinking: as aim of high school, 26
Role: feminine, development of, 6
Rural youth: and social values, 18

Salary: average, of secondary-school staff, 76; differences in relation to sex, 77
Scheduling, flexible: experiments in, 50
School boards: authority to assign teachers to nonclass activities, 62
School size: and availability of curriculum offerings, 36; effect on activities program, 36; optimum for senior high school, 69
School year: lengthening of, 29
Science: high-school enrollment in, 37; high-school programs in, 41
Secondary school: curriculum of, 34; enrollments in, 36; nonclass experiences in, 57; organization of, 34; organization and staff of, 67; program for noncollege youth, 29; role of, 67
Selection: processes of, of administrator, 72
Self-accepting attitudes: and Negro-white attitudes, 18
Senior high schools: organization and staff of, 69
Sex: in relation to salary of secondary-school teachers, 77
Sibling similarity: in both intelligence and achievement, 14
Slow-learning pupils: effect of separate classes on, 34
Social adjustment: and emotional adjustment of adolescent, 15
Social attitudes: of adolescents, 17
Social change: a task of secondary education, 24
Social cohesion: as an aim of general education, 25
Social-distance scale: use in group formation study, 9
Social status: defined by participation in high-school nonclass activities, 60
Social studies: objectives of, 25
Sociempathy: and status in a group, 9
Societal conditions: as curriculum determinants, 24
Socioeconomic class: and adolescent group membership, 10; and behavior of adolescent, 16; values reinforced by school, 9
Sociometric status: relation to various factors, 17
Somatotype ratings: of adolescents, 13
Specialized education: nature of, 25
Sports: interscholastic, balanced with formal curriculum, 61
Staff: of secondary school, 67; utilization in secondary school, 71
Status persons: characteristics of, 9
Student activities: discussion of, 57
Student councils: discussion of, 59
Supervised study: effectiveness of, 52

Tape recording: use in language instruction, 51
Taxonomy: of educational objectives, 27
Teachers: beginning, orientation of, 76; beginning, problems and deficiencies of, 76; dismissed, characteristics of, 78; drop-outs, reasons for, 75, 78; effective, qualities of, 78
Teacher assistants: in driver education, 72
Teacher load: formulas for, 77; nonclass activities as part of, 62
Teacher personnel policies: improvement of, 72
Teacher-pupil relationships: characteristics of effective, 50
Teacher supply: secondary school, 74

Teaching: attitude toward, of adolescents, 18
Team teaching: discussion of, 72; effect of, 51; experiment in, 50
Television: closed-circuit, advantages of, 71; stations, network of educational, 51; use of, to supplement instruction, 50
Thematic Apperception Test: and the adolescent girl, 15; and parent-child relationships, 7
Time budgeting: learning of, 59
Value patterns: of adolescents, 24
Values: of adolescents, 17
Vocational aspirations: of adolescents, 18
Vocational choices: parents' prediction of, 18
Vocational education: aims of, 26
Vocational interests: of adolescents, 18
Wechsler Adult Intelligence Scale: and Indian youth, 14
Youth culture: nature of, 5

REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association. Contents are listed in the Education Index.

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By National Education Association of the United States, Washington, D. C.

Volume XXX, No. 2 **April 1960**

Guidance and Counseling

Reviews the literature for the three-year period since the issuance of Vol. XXVII, No. 2, April 1957.

TABLE OF CONTENTS

Chapter *Page*

Introduction 96

I. The Philosophical Foundations of Guidance and Personnel Work 97

WILLIAM D. WILKINS, *New York University, New York, New York*
BARBARA J. PERLMUTTER, *New York University, New York, New York*

II. The Organization and Administration of Guidance Services 105

WILLIS E. DUGAN, *University of Minnesota, Minneapolis, Minnesota*

III. The Selection, Preparation, and Professionalization of Guidance and Personnel Workers 115

GEORGE E. HILL, *Ohio University, Athens, Ohio*
DONALD A. GREEN, *Ohio University, Athens, Ohio*

IV. The Counseling Function 131

HERMAN J. PETERS, *Ohio State University, Columbus, Ohio*
WILLIAM J. MUELLER, *Ohio State University, Columbus, Ohio*

V. The Use of Appraisal Data by Guidance and Personnel Workers 141

FRED C. PROFF, *University of Illinois, Urbana, Illinois*

VI. Occupational and Educational Information 148

RICHARD M. RUNDQUIST, *University of Kansas, Lawrence, Kansas*
ROBERT APOSTAL, *University of Kansas, Lawrence, Kansas*

VII. Group Procedures in Guidance and Personnel Work 158

KENNETH B HOYT, *State University of Iowa, Iowa City, Iowa*
GILBERT D MOORE, *State University of Iowa, Iowa City, Iowa*

VIII. The Evaluation of Guidance and Personnel Services 168

JOHN W M ROTHNEY, *University of Wisconsin, Madison, Wisconsin*
CARL J ENGWALL, *University of Wisconsin, Madison, Wisconsin*

Index 176

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EDUCATIONAL PRESS ASSOCIATION OF AMERICA

INTRODUCTION

This issue of the REVIEW OF EDUCATIONAL RESEARCH is the tenth concerned with guidance and counseling. Significantly, it is the first joint effort of the American Educational Research Association and the American Personnel and Guidance Association.

With only one or two exceptions, topics for this issue are similar to those of the issue of April 1957. A chapter on the use of appraisal data —primarily the use of test results by the counselor—is again included. Although most research on educational and psychological measurement is covered in a separate issue, it seemed only logical to review that research here which has special application to the counseling function. Guidance activities at the elementary-school level and the guidance role of the teacher generally, although not emphasized by chapter headings, are provided coverage commensurate with their recognized importance.

Contributors stressed the need for more research. The reasons for their exhortations are obvious but need underscoring. It is clear that the profession has many unanswered questions. Furthermore, the national spotlight has been focused on guidance and counseling activities, and expectations for the productivity of guidance programs in schools have never been higher. Such recognition of the importance of guidance and counseling is heart-warming, but permanent gains in acceptance can only be consolidated by means of increased research. Each counselor and personnel worker has a personal stake in "operation research." He also has an obligation to share through publication the results of his research efforts.

The chairman wishes to express appreciation to the planning committee and to the additional contributors who wrote the various chapters.

EDWARD C. ROEBER, *Chairman*
Joint AERA-APGA Committee on Guidance and Counseling

CHAPTER I

The Philosophical Foundations of Guidance and Personnel Work

WILLIAM D. WILKINS and BARBARA J. PERLMUTTER

PHILOSOPHY undertakes to study the general principles in a field of knowledge. For the purposes of this review, the term *philosophy of guidance* is construed as embracing philosophical and theoretical rationales fundamental to guidance services. In terms of this definition, there exists a plethora of books on guidance methods and services, but there are almost no books that deal with theory; articles on the philosophy of guidance are outnumbered 30 to 1 by articles on methods and procedures. There is, nevertheless, some material in journals on the philosophical and theoretical foundations of guidance.

This review makes no reference to dissertations, because the philosophy of guidance is a subject that appears to have been wholly neglected by doctoral researchers. That fact supports the statement that there are many practitioners in the field of guidance, but few philosophers.

Some Philosophical Bases of Guidance

One of the serious examinations of the point of view of persons in the field of guidance and personnel work was contributed by Wrenn (38). Though he modestly set himself forth as "only a philosophical amateur," his discussion of the philosophical and psychological bases of personnel services in education was a unique contribution. It was a serious indictment in that his survey of the literature led him to these conclusions: (a) authors make many philosophical and psychological assumptions, both explicit and implicit, but usually neither examine nor test them; (b) few authors pretend to possess a consistently operating philosophy or a systematic psychological point of view. From the editor of the *Journal of Counseling Psychology*, this is a serious charge. The senior author of this chapter concurs, not only on the basis of the present review, but also on the basis of experience gained throughout his years as editor of the *Personnel and Guidance Journal.*

Wrenn (38:78) also saw need for the personnel worker to "study the differences that may exist between the philosophical and psychological concepts involved in the *establishment* of his educational function and those that are apparently utilized in the *practice* of his work." He pictured the counselor as a product of his past academic and cultural experience, the base modified by his accumulated psychological knowledge, his continuing experiences, and his present values. He saw the need for each

personnel worker to work hard to establish an integration of aims and procedures.

Wrenn considered the main stream of personnel work henceforth as being formed by the two converging streams of philosophical and psychological understanding. He summarized it (38: 79-80) as follows: "To say that the science of psychology cannot remain apart from the world of ends and values is not to say that it should blend its methods or lose its distinctiveness. It is of the utmost importance, however, that knowledge of man's *behavior* be seen within the framework of the *meaning of his existence* in the universe."

Empiricism

Some of the roots of psychology were originally in philosophy. As it grew to be a discipline in its own right, it sought to identify more and more with science. This transition emphasized empiricism. The literature continues to emphasize this approach, although there are at times signs of uncertainty. Walters (34), in a thoughtful paper in which he considered the disciplines of metaphysics, religion, and psychotherapy, discussed psychology's empirical rigidity. He noted that the empirical viewpoint was developed to secure recognition of psychology as a science, and that it is being modified as the field matures. In the light of this article, one might note Bordin's statement (4) that we must retain a "hardheaded empiricism." Bordin outlined his theory of personality development, an eclectic synthesis of many psychological theories, primarily the empirical. Mowrer (14) reappraised some of the philosophical premises on which contemporary psychotherapy, counseling, and diagnosis are predicated. He dwelt at length upon psychology's preoccupation with mind as a servant of the body, particularly as treated in Freudian psychology, and explored the meaning of the reversal of this relationship for counseling and the significance of the problem for religious thought.

Theories of Personality

Nosal (19), relating various theories of personality to philosophical problems, encouraged research in the philosophical (especially the metaphysical) bases of guidance and of the practice of psychology. Wrenn (40), in a sage commentary on 65 references, discussed the status and role of the school counselor and found his status fairly secure. He noted that the counselor's loyalty is sometimes split between his desire to help the counselee and his need to conform to the demands of society. Sensitivity to a simple creed of human relations was perceived as insufficient to the resolution of this conflict, which must be sought in an active involvement in the search for truth and the highest religious values involved in the counseling relationship. He concluded with a brief note on what

one might designate as the religious or ethical implications of personnel work. Dugan (6) edited two essays in which Carl Rogers and E. G. Williamson brought their thinking up to date on various philosophical and psychological issues inherent in counseling.

Aspects of the counselor's personal philosophy and personality were emphasized in a number of writings. Tyler's rather intriguing article (33) advocated development by each personnel worker of his own view of the universe, his own theory of personality, and his own style of counseling from a study of physiological and psychological laboratory research; psychoanalysis; the social disciplines of anthropology, sociology, and personnel classification; and philosophy and religion.

Values

Williamson (36) discussed the role of values in counseling, arguing that counseling cannot be independent of values and that counselors can help to "teach counselees how to understand more clearly their own value orientation and how to guide their behavior more rationally and consistently in terms of the standards they have chosen." Patterson (22) contended that a counselor must recognize that his moral attitudes and values enter into counseling. In his textbook, Patterson (21) dealt with theoretical analysis of the therapeutic relationship. Phenomenological theory and client-centered therapy were given preference and precedence. He saw the goal of psychotherapy as a possible independence.

Arbuckle (2) stated that many philosophical issues in counseling are of a realistic and down-to-earth nature. Thus, a real problem for the counselor is the precept, "Know thyself." He cited four allied problems (the effect of the counselor's religious orientation on his work, the effect of his view of the nature of man on his counseling method, his responsibility to counselee and society, and effective counselor education) and concluded that the counselor must have a defined philosophy of life in order to fulfill himself and his role in the counseling situation. Stroup (30) contended that personnel workers in the field of student counseling have, in the past, been relatively unconcerned with, and inactive in, formulating and extending theory. He believed that this is so because counselors are pushed into practical corners and have had, therefore, to borrow many of their theoretical constructs from other disciplines. In a symposium, Durnall, Moynihan, and Wrenn (7) evaluated the role of religious and moral values in counseling.

Hagmaier and Gleason (10), in a wise and compassionate book, attempted to synthesize Roman Catholic doctrine and practice with the insights of depth psychology. Braceland and Curran and others had previously worked in this theoretical area and had made real contributions; Hagmaier and Gleason combined a realistic spiritual approach with modern psychiatric approaches in a practical way. They dealt throughout with

such difficult problems as alcoholism, masturbation, homosexuality, and scrupulosity. This truly significant work has wide application outside Roman Catholic circles.

Rogers (27) set forth his philosophy on the nature of man and its relationship to counseling. Moynihan (15) contended that guidance workers, as judged by recent writings, are not explicit in the philosophy underlying their work. He saw a movement toward a development of more precise theoretical positions as a result of the influence of psychology and sociology and predicted that this trend will be more amply reflected henceforth.

Theories Related to the Guidance Process

Significant additions to theory were made in areas where discussion of practice is the normal theme. In his study of Vassar College, Sanford (29) discussed growth trends and related them to the commonly stated aims of liberal education. He predicted that knowledge of personality development in late adolescence will be applied in the colleges to bring behavior under more conscious control. Mueller (16) undertook the difficult task of setting up hypotheses for a theory of campus discipline. Pepinsky (23) discussed the tendency of the personnel worker in colleges to think that he knows what is "good" for the student, independently of the views of his professional colleagues and their work. He suggested that more research on the expectations and productivity of college students might temper the viewpoint of personnel workers or, at least, present some evidence for their beliefs.

Kitson (13) stressed the need to move from the "vaporous and elusive components of mind" to a study of vocational behavior. Two contributions to the understanding of vocational development and adjustment were those of Super (31) and Roe (25). Both books offer theoretical concepts which will certainly influence research. Super evaluated the place of work in the life span and discussed his theory of vocational development. He linked the processes of vocational choice and adjustment to the self-concept, which is initiated through a person's identification with people around him and is influenced by his perception of his success and failure in trying roles and by the satisfactions and dissatisfactions he experiences. Super developed this theory through his work with the Career Pattern Study and in several books, and the present work emphasized the developmental aspects of vocational behavior. Putting emphasis upon sociological knowledge of career patterns and upon psychological processes of job choice, Super is exempt from the aforementioned indictment of those who work without a systematic psychological point of view. Roe presented a summary of information in the area of psychology of occupations and her theory of occupational choice.

In a series of eight articles, Samler and others (28) discussed basic approaches to mental health, making a needed contribution to theory in

the personnel field. They described several programs and their settings; in each article methods of countering certain trends of our times are discussed.

Points of View About the Interpersonal Relationships of Counselors

The implications of relationships of the counselor to others were stressed. What rationale will place the counselor in an acceptable light for those who can make use of his guidance—students, parents, teachers, and administrators? An answer is not readily available, but several authors contributed to a further understanding of interpersonal relationships of the counselor. Among them, Rogers (26) discussed the nature of the relationship between counselor and client; and the inner, or subjective, viewpoint of the counselor. He speculated that the counselor can create relationships only in terms of the growth achieved in his living.

According to Tompkins (32), counselors must understand what they are trying to do, educate others as to their duties, and avoid taking themselves too seriously; he stated that many times counselors neglect to apply to their own lives principles known to contribute to sound mental health. Froehlich (8), believing counselors too preoccupied with effecting change in their clients, proposed that they let counselees be more active, self-directed, and self-determined. Nordberg (18) contended that the goal of psychological integration is unsatisfactory as a sole criterion for counseling. He proposed reality as the criterion and as the best integration factor. Fromm (9), discussing self-discipline as a necessary part of adjustment for the student and the need to provide a school program conducive to learning self-control, believed counselors can help educate teachers to adopt a guidance point of view in understanding the child and his problem. Weitz (35) discussed the influence of the personality structure of the counseling participants and the way it is symbolized in the speech of the interview. Wrenn (39) saw the self-concept of the client emerging as a significant factor in the counseling process and as an important variable in the evaluation of counseling. The total impact of their relationships with the counselor upon the users of guidance and personnel services may be difficult to assess; yet this relationship, in the minds of some authorities, can help the development of self-direction, independence, and maturity—goals which are inherently essential to adulthood in a democratic society.

The Relationship of Guidance and Education

During the period of this review, with physical and moral survival at stake, many nonprofessionals urged that more attention be given to education, especially the meeting of children's needs, and the utilization of

all human resources. Four statements interpreted the climate of attitudes. Reuther (24) pointed to the continual crisis which leads to so much greater expenditure on the national military establishment than on education. Benjamin (3) lamented our concern as a nation for material things and our lack of interest in education, prevention of delinquency, and salvaging human resources. The Educational Policies Commission of the National Education Association (17) recommended that *all* prospective teachers take courses in the philosophy and methods of guidance, psychology, and mental health and that *all* schools have staff personnel with special training in guidance. Wolfle (37) related guidance to evolving educational policies, paying particular attention to better counseling methods, fuller use of potentialities, and diversity of educational standards.

Guidance and personnel workers were aware of the need to relate educational practices to a guidance and personnel point of view. Brown (5) contended that, if teachers adopt more guidance practices, they will come closer to realizing their objectives as teachers. He also stated that, as teachers and guidance people work together, teachers themselves become guidance workers and provide better than ever for the total development of individuals in their classes. Hiltner (11) stated that counseling is education insofar as the student probes his inner self to acquire a new perspective.

Owen (20), who stated that counseling in America is an academic fad to the extreme, was a dissident voice. He contended that much that passes for counseling in higher education today is a waste of time. He did not advocate doing away with the entire system but urged a new emphasis. He suggested that students be told from the start that they will have to work, and work hard, to stay in college. One wonders how typical his viewpoint is among college personnel.

Adams (1) stressed the need to re-examine the articulation of programs in elementary, secondary, and higher education. He maintained that the danger of extreme diversity in education can be lessened by the widespread availability of information, adequate counseling of students, and effective relationships among institutions concerned with education. Hutson (12) defined the function of guidance: to accomplish the distribution of students among educational and vocational opportunities and to bring about the adjustment of the individual to facilitate maximum development. He concluded that guidance is important because it gives the administrator a framework by which he can judge his program.

Summary

Recent books and articles about personnel work show little evidence of a considered philosophical position or psychological point of view. A basic philosophy is implied in some, but explicit in few. There is a real need to develop general principles and a theoretical foundation.

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CHAPTER II

The Organization and Administration of Guidance Services

WILLIS E. DUGAN

RESEARCH in organization and administration of guidance services continues to be scanty. Previous reviews have noted the paucity of substantial research relating to problems of guidance policy, staff qualifications and relationships, budget, facilities, and counselor duties. Studies during the last three years were predominantly survey and descriptive, rather than experimental. Those reviewed in this chapter may reveal some needs for research relating to organization and help to stimulate investigation.

Impact of National Developments

Guidance during the last two decades has been interpreted as encouragement of youth's development in terms of a basic concern about individual differences and as active assistance to youth in making appropriate adjustments to personal, educational, and vocational needs and problems. In short, guidance services have aimed primarily at self-realization of the individual. This fundamental meaning of guidance in practice has not changed. However, it is obvious that in the current national scene, guidance, more than ever before, has come to mean early identification of talent, motivation of talent, and assistance to all youth in attainment of their fullest possible potential. Now, if ever, schools have the support of the public for development and improvement of organized programs of guidance services, and they are looked to to accomplish this goal.

Marked acceleration in the growth of organized guidance services in the schools reflected the influence of developments on a national level and concern for full utilization of human resources. Thoughtful policy statements by prominent educational organizations, scientific groups, and lay conferences supported extension and improvement of guidance services at both elementary- and secondary-school levels. Wolfle (47) urged the necessity for educational services to keep pace with rapid scientific and technological advancements, if full utilization of human talents is to be achieved.

Provisions of the National Defense Education Act of 1958 affirmed national support of more highly organized guidance services. Recognizing the importance of nationwide improvements in school guidance programs, Derthick (15) defined the urgency of our nation's concern about maximum development of the talent of our youth and pointed out the avenues of federal support available for organization and improvement of local pro-

grams of testing and counseling. Stressing a sometimes forgotten source of manpower, Berdie (6) identified the imperative need to facilitate through guidance the identification and upward movement of talent from lower socioeconomic groups. Wrenn (43) expressed the increasingly accepted belief that guidance services must focus upon the normal developmental needs of children and seek, not merely to correct deficiencies, but also to develop talent.

As part of his report on American secondary schools, Conant (13) recommended that counseling be started in the elementary school and that it be closely articulated with a secondary-school program which provides at least one full-time counselor for every 250-300 students. A report on Conferences on Testing and Counseling (3), sponsored by the American Association for the Advancement of Science, stressed the need for improved programs and presented some conditions essential for effective testing and counseling services.

Administrative Responsibility and Support

Expansion of staff for specialized guidance and psychological services has posed new problems in organization and co-ordination. Surveying 432 public high schools in 48 states, McQuinn (30) examined major handicaps affecting the organization and administration of guidance services. He found that about one-third of the schools had no guidance program and many others had only a limited program. Bad as these results appear, they still seem overly positive in light of the hodgepodge of activities which is so frequently called a guidance program. Reporting a survey of organization among 308 guidance specialists in 45 states, Keppers (25) indicated the importance of (a) qualified personnel; (b) teamwork among school staff, pupils, and community in over-all planning; (c) adequate ratio of counselors to students; and (d) flexibility in organization to meet distinctiveness in school settings and variations in pupil needs.

In a more restricted geographical area, Kuhn (26) examined the functions of guidance directors in 25 county high schools by means of personal interviews with 109 principals, counselors, teachers, and directors of guidance. Differences in functions were attributed in part to lack of agreement within the administrative and teaching staffs of the high schools as to what guidance services should accomplish. Basic factors and dimensions within the school and community which aid in the determination of adequate organizational procedures were described by Farwell and Peters (18). The significant role of the school administrator was emphasized by Hatch and Stefflre (22), who described essential decisions which must be made about staffing, budget, facilities, and staff relationships. Peters (34) presented some fundamental questions which administrators should consider in attempting to appraise the nature and quality of the school guidance program.

These surveys and opinions reflected the complex problems inherent in organizing and co-ordinating effective guidance programs. Thus far, the organization of a guidance program has been too dependent upon an "educated" guess; it will probably remain so until counselors and guidance workers examine the quality of their products in light of goals and procedures of the programs.

The development of guidance services at the elementary-school level and their co-ordination with the total guidance program continued to be discussed. According to Cottingham (14), elementary-school guidance is a new frontier, particularly in respect to the pattern of organization and function appropriate to this level. Articulation between elementary- and secondary-school guidance programs clearly demands administrative leadership and careful investigation of practices.

Need for articulation was also stressed by Miniclier and Curtis (31), who pointed out the concern of school administrators with new approaches to co-ordination of a fuller range of elementary- and secondary-school guidance services. Two surveys yielded interesting hypotheses. Smith (37) found that 93 percent of a small sample of elementary-school teachers believed guidance workers to be needed in the elementary school. Less agreement was found among the teachers about the primary functions of such specialists. In a stratified sample of elementary schools in Los Angeles County, Halverson (21) examined the organization and administration of guidance services on the basis of evaluative criteria developed by a survey of the literature. General principles of organization and administration were seen to be utilized, but inadequacies were noted in facilities and in numbers of qualified personnel. Although logic is on the side of extending the guidance program to elementary schools, the goals and *modus operandi* remain unclear.

In a few instances state leadership has been an important factor in the development of local programs. Although more than one-half of the 45 states reporting indicated a shortage of trained guidance personnel, Weitz (43) found strong reservations concerning the employment of guidance workers who had not been prepared as teachers. Acree and Marquis (1) reported on two surveys in Tennessee, separated by a three-year interval in order to determine growth in guidance programs. The sampling of schools was small, but the study revealed that guidance programs were few and that little development occurred from 1952 to 1955.

Two other studies of state and local programs suggested substantial recent growth. While surveying Kansas public-school counselors' professional qualifications and experience, Baird (5) examined administrators' reports on administrative bases for guidance programs in operation. Small schools appeared to have less adequate programs. Pope (35) traced the growth and development of guidance services in North Carolina and found marked growth indicated by the fact that nearly two-thirds of the high schools reported that they had counselors in 1953-54, as compared to one-fourth in 1939.

The problem of maintaining both quality and quantity of counselors was discussed by Nugent (32), who examined the status of guidance programs and of counselors in white public high schools of Louisiana and saw need for additional qualified personnel. His findings could probably be duplicated in many states. The explosion in school population will only aggravate the personnel problem. The question of ersatz counselors will increasingly haunt state educational leaders.

Facilities, budget, and resources for guidance services received little attention, even through survey research. An exception was Parker's survey (33) in which the opinions of school principals, counselors, instructors of counselors, and state guidance supervisors were sought concerning the location of the guidance offices within the school plant, particularly in relation to the main administrative office. Responses from more than 250 respondents in 19 states of the North Central region revealed that counselors and counselor-educators were in agreement in favoring distinct separation of guidance offices from administrative offices. Principals favored a closer physical relationship for such offices.

Hoyt and Laughary (24) investigated counselors' acquaintance with, and utilization of, referral resources. Their data revealed that counselors, particularly those in rural areas and those with little training, were not making adequate use of referral sources available to them. Good referrals require an abundance of time and energy, as well as adequate preparation of counselors. Schools served by counselors without sufficient released time, without a knowledge of resources, or without skill in bringing about good referrals, cannot meet the needs of pupils who could profit from community or state psychological services or other resources.

For many years the professional literature has been filled with suggestions regarding adequate cumulative records. Examining the status and extent of permanent cumulative records in selected Missouri school districts, Looby (27) found that, although progress had been achieved, more was needed. The results of Looby's survey emphasize once again the importance of special provisions, such as adequate clerical assistance, for the development of adequate records.

It is startling to find so few studies on facilities, budget, and resources. Is it thought not respectable to report such studies? Or is the reason a change in the interests of researchers as the profession matures?

Duties and Responsibilities of Counselors

Counselors on the job and graduate faculties concerned with the preparation of counselors expressed growing concern that there should be clearer delineation of the functions and responsibilities of counselors. Many influences, including the school's setting, expectations of administrators, preferences of counselors, and needs of pupils, determine apportionment of the counselor's time. In a review of the literature related to

status and functions of the counselor, Wrenn (49) carefully analyzed developing trends and provided a clearer delineation of basic issues in the counselor's work and relationships. In addition to presenting other conclusive data, Wrenn documented the assumption that counseling has "fairly secure status." He pointed to the fact that such status increases the profession's vulnerability unless it clarifies its position on some basic points, such as counseling versus psychotherapy, the counselor as a specialist and as a general educator, the counselor's personal self and professional self, and the counselor's loyalty to the individual client and to society. Wrenn's synthesis of the issues was one of the most helpful reviews.

A few studies explored the counselor's functions. Purcell (36) examined by questionnaire the duties of 106 counselors in a centralized area, and found that: (a) 71 percent were employed full time; (b) the median load was between 500 and 599 pupils; (c) individual counseling was a priority duty; (d) 55 percent were responsible for actual assignment of pupils to particular class sections; (e) 64 percent counseled on chronic attendance problems; and (f) 75 percent administered tests. Tennyson (42) studied the use of time by 152 certified counselors throughout Missouri. His data revealed interesting differences between how counselors actually allocated their time and how they would prefer to utilize it. Significant differences were found in several spheres: counselors expressed a desire to allocate less time for assistance in administration and dissemination of occupational information; they wished more time for follow-up services and research.

Allard (2) analyzed the activities in which 191 certified counselors were engaged and the extent to which six selected factors were related to these activities. He concluded that the ratio of counselors to students was too small to permit individual counseling.

A much neglected function of counselors on the job has been identified as research. Counselors perceive the need for more attention to be given to research and service studies (42), but Dyer's survey (17), seeking evidence to emphasize the need for counselors to develop local norms and prediction studies for use in counseling, showed clearly the small amount of prediction research done by counselors. It is evident that research cannot be viewed as an extracurricular counseling activity. Education programs for counselors will have to develop research skills necessary, at least, for research in connection with their day-to-day work. In addition, administrators will have to recognize research as an essential function of the counselor and provide time for this purpose.

Other survey results demonstrated the active role of counselors in clerical and administrative work. Studies of this kind, obtaining data about spheres of work in which counselors are expected to be active, would perform a significant service in clarifying conditions and functions which reduce the counselor's use of time in professional work.

Houghton (23) investigated the counselor's role as perceived by 2690 seniors, 729 teachers, 39 administrators, and 53 counselors in 19 public

high schools. The four groups perceived the counselor's role similarly only in the academic area. Interesting variations in perceptions of the counselor's role were found in schools of different types and different geographical locations. Stewart (40) outlined objectives and rights for counselors.

Functions of city-wide directors of guidance were studied by MacDonnell (29). His survey of job analyses of 200 city-wide directors of guidance in 40 states attempted to determine characteristic functions. Directors were asked to assign varying degrees of essentiality to their duties. The analysis revealed that much similarity of basic functions existed in cities of all sizes. Directors did not want to be administrators exclusively; they believed interviews (for counseling or other purposes) with teachers, parents, and counselors to be essential.

It was also encouraging to see some research related to functions of guidance at the elementary-school level. Bosdell (9) studied guidance responsibilities as perceived by elementary-school personnel and related their perceptions to personality needs as measured by the *Edwards Personal Preference Schedule*. The study indicated that job title, more than personality needs, was related to the respondents' assignment of responsibility for guidance services.

There is need for more studies which deal with perceptual differences concerning responsibility for guidance among counselors, teachers, administrators, pupils, and the public at large; equally important are experiments which might developmentally resolve the most critical differences.

Instructional Relationships in Guidance

Writings continue to stress the role of the classroom teacher in guidance. Characteristic of this emphasis is Arbuckle's generally accepted contention (4) that a teacher, who is concerned with children, their behavior, and the interaction of these children with their environment, is, in effect, a guidance worker. Willis (46), Gordon (20), and McCabe (28) support the view that the classroom teacher is an integral part of the total program of guidance services. In a study restricted by the size of the sample, Williams (45) found that teachers accept guidance concepts. Interviews with 94 teachers in six elementary schools elicited responses to 15 guidance principles and problem situations to which they were applicable; results showed acceptance of guidance concepts by the teachers, but lack of the preparation and understandings needed for competency in guidance. Stewart (41), studying certain factors influencing participation of classroom teachers in guidance programs and their attitudes toward them, found that teachers do not accept and participate in guidance programs to the same degree. The attitudes of teachers toward adopting an active role in guidance programs remains a fertile area for research. What kind of teacher refuses to help better meet the needs of pupils?

If teachers accept an active role (apparently most do) in guidance programs, many still have to develop adequate understandings and skills. The reasonableness of this assumption was demonstrated by Graham (19), who studied beginning teachers in terms of their professional preparation, feeling of adequacy, and performance in rendering guidance services. They were found best prepared with regard to understanding individual differences and philosophy of guidance, and least well prepared in the realm of counseling. On the other hand, when teachers become aware of pupil problems, they seem able to make some appropriate adjustments in the climate of the classroom. For example, Spivak (39), using experimental and control groups of seventh-grade pupils, sought to ascertain the effect of a teacher's knowledge of pupils' problems upon reduction in problems reported by the same pupils four months later. Evidence of reduction obtained may have limitations resulting from the small size of the sample.

The question of how to help teachers develop guidance understandings and skills was explored by Clarke (11), Sorenson and Beals (38), and Carey (10). Without controlled experimentation, Clarke (11) reported a technique, described as the *Attitude Consistency Study*, for increasing the effectiveness of teachers and counselors in identifying children who need help—thereby utilizing more effectively the services of specialized psychological staff. The value of counselor-education courses for teachers was demonstrated by Sorenson and Beals (38), who examined the guidance practices of 500 homeroom teachers in junior high schools. Teachers in this group who had at least nine semester hours of preparation in the field of counseling tended to use various guidance tools and techniques more than did those teachers without such professional training for guidance work. Using an experimental design, Carey (10) examined two methods for securing teamwork among teachers, guidance specialists, and referral services in child-study phases of individual guidance. The method developed by teachers through inservice educational activities appeared more successful than a method developed mainly by guidance specialists and administrators. This result is certainly consistent with learning theory.

Several articles aimed to assist teachers in fulfilling their functions in the field of guidance. The following examples illustrate the variety of available tools. Doi (16) developed a self-rating checklist to help teachers identify ways in which they contribute to guidance services. Berry (8) provided helpful aids for the classroom English teacher who seeks to integrate guidance units and activities in the subject-matter program. Coleman (12) advanced methods for assisting teachers and counselors in the use of test results. Berdie and others (7) compiled helpful normative data and principles as an aid to the use of test data in counseling. White (44) analyzed the content and format of 114 student handbooks to establish essential characteristics. Out of a variety of critical reactions, several positive recommendations were derived for development of such handbooks as effective guidance aids.

Although some of the research in this section of institutional relationships was contradictory in its findings, it demonstrated a persistent interest. There is little doubt that teachers are considered essential to the proper functioning of guidance programs. The question of how to enable them to develop the necessary understandings and skills is still unanswered.

Summary

Because national and local expectations are so high with respect to guidance, guidance programs have reached a critical point in their development as mature and accepted services in schools. Rapid expansion has occurred, not only in the addition of guidance staff, but also in the search for effective means of organizing and co-ordinating specialized guidance services. The basic problems of organization, co-ordination, functions and relationships of various staff members, physical facilities, and resources need further investigation. Counselor-education programs in graduate schools and counselors on the job must be held responsible for the extension of research on these problems. If the profession can produce organizational results and develop the necessary pool of research, the past era will be known as the Stone Age of guidance history.

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CHAPTER III

The Selection, Preparation, and Professionalization of Guidance and Personnel Workers

GEORGE E. HILL and DONALD A. GREEN*

SURPRISINGLY little of the writing on guidance and personnel work in educational institutions dealt with the profession as such. Analysis of the articles in the *Personnel and Guidance Journal* (9) for a five-year period (1952-57) revealed that, of 411 general articles, 14 were concerned with "counselor training." Of the 136 articles classified as "research," only two dealt with counselor education. The present reviewers identified 17 articles in the same journal, from 1956 to 1959, as dealing with counselor education, seven of them classifiable as research.

In the last three years, as in earlier periods (73), the majority of published investigations were status studies. Basic, longitudinal research on the selection, education, and subsequent effectiveness of guidance and personnel workers was not found. Research by doctoral students in the universities was frequently not published. An effort to locate such research appropriate to this chapter disclosed 16 theses written in the last three years unpublished in any form except as abstracts. Several factual reports were available only in mimeographed form. Will current shortages of guidance and personnel workers prompt a surge of better research and more publication regarding the selection, education, and professionalization of such workers?

Selection of Guidance and Personnel Workers

Careful selection of counselors and other personnel workers is essential. This assertion was reiterated by professional committees (3, 4), by personnel administrators (77), and by counselor-educators (5, 36, 55, 88, 90). Most of the attention given this question was primarily concerned with acceptance of candidates for graduate study in counseling. Some studies were made of counselors in training, which threw light upon the complexity of the problem of sifting out the least competent. Little attention was given to the question of how people decided, in the first place, to seek graduate education in guidance and personnel; nothing was published during the last three years on the selective placement of persons in this field. These last two aspects of the selection process were reported as of considerable concern to counselor-educators in a survey of 30 Midwestern educational institutions (34).

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Survey of Selection Procedures

Santavicca (65) received information from 150 institutions, 129 of which offered graduate courses in counseling. The predominant emphasis in selection was upon academic competence, as judged by undergraduate record and as measured by tests. Teaching experience, work experience, and personal adjustment (as judged by interviews, letters from employers, rating scales, and staff judgments) were also considered by more than half of the institutions training counselors. Miller (53) surveyed 36 Midwestern universities and discovered little use of tests in selection of trainees. He asked for information regarding an approach to selection that has received increasing attention, the use of self-selection devices and techniques. The chief means of self-selection employed was the practicum, through which trainees were helped to achieve greater self-understanding and clarity of goals. Group discussion and interaction among group members, participation in research, and interviews by staff members were also reported as used for this purpose.

MacMunn and Ross (52) found that training institutions denied admission to 17 percent of applicants for the master's degree and 44 percent of applicants for the doctor's degree. Although research was done on the characteristics and competencies of counselor trainees, this research seems not to have changed selection procedures of universities. Surveys of current practice disclosed essentially the same practices to be followed as were reported in past years.

Sources of Guidance and Personnel Workers

It was generally assumed that people who become guidance and personnel workers come chiefly from the ranks of the teaching profession and largely from the schools where they become counselors (35). Stevens and Hoppock (67) found verification of this assumption in their survey of large high schools and colleges. Their survey included, however, only the 50 largest cities, the 50 largest universities, 50 private agencies, and 50 manufacturing concerns. The manufacturing concerns also drew their personnel workers chiefly from within their organizations. Goedeke (28) surveyed recruiting practices in school systems of 52 large cities, with results similar to those of Stevens and Hoppock. It is not known to what extent similar practice obtains in medium-sized and smaller schools. If such practice is widespread, it is not surprising that little research has been reported on selective criteria used by school administrators. Hulslander and Scholl (38) canvassed the opinions of high-school and elementary-school principals regarding desirable qualifications for the counselor. These administrators wanted counselors with teaching experience, and a considerable number of them preferred experience within their own school systems.

Personal Characteristics of Counselors

The search for a characteristic personality pattern deemed desirable in counselors followed much the same path as the earlier search for a desirable personality pattern for teachers. Enthusiastic search for the necessary traits was followed by skepticism, as evaluation of the effectiveness of the practitioner proved to be very difficult. There continues to be a good deal written about what the guidance and personnel worker should be like. Unlike the earlier writings, which often presented extensive trait lists, the more recent focused attention on the total personality of the counselor.

Hitchcock (35), Wrenn (90), Tooker (77), and Hobbs (30) stressed the importance of the general personality pattern of the counselor, cautioning that we have neither a clear picture of what this pattern should be nor effective devices for estimating the effective potential of any prospective counselor. Appropriate training, aptitudes, temperament, interests, physical attributes, and working conditions for the school counselor were estimated in the *Estimates of Worker Trait Requirements* (79). Patterson (58) reported an extensive study involving the testing of trainees in rehabilitation counseling in 19 institutions. The *Minnesota Multiphasic Personality Inventory* (*MMPI*), the *Strong Vocational Interest Blank*, the *Miller Analogies Test*, the *Kerr-Speroff Empathy Test*, and the *Edwards Personal Preference Schedule* were administered to from 143 to 190 trainees. The results were reported in some detail and provided a useful comparative body of data.

Hoffman's ingenious analysis (37) of counselors' subroles by means of 165 interviews clearly pointed up one of the reasons that a standardized personality pattern for the effective counselor was probably a will-o'-the-wisp, namely, the amazing variety of behaviors used by the counselor. Studies of guidance workers' jobs showed that this work was also highly varied and far from standardized. Vassallo (81) surveyed secondary-school guidance workers in the mid-Atlantic area. Tennyson (76) carefully analyzed how Missouri counselors spent their time. Purcell (61) asked a group of Long Island counselors to report their duties. Wendorf (85) surveyed the school guidance workers in Ohio. All of these studies provided clear evidence of widely varied duties of guidance workers. It seems safe to assume, therefore, that the kinds of characteristics required—though the merit of "personality" is not to be denied—continue to be difficult to standardize.

Warnath (82) pointed out that the kinds of characteristics valued in the training setting were not always the same as those needed on the job later. Hedahl (32) compared the expectations of counselors and their administrative superiors in three university counseling centers with regard to the counselor's role. She found general agreement both between the counselors and their administrators and among the three administrators. At least we may feel encouraged to believe that highly trained people usually reach some agreement on what to expect of a counselor.

A survey of the opinions of 600 junior and senior high school principals in California about the desirable characteristics of guidance workers was reported (87). A list of traits is outlined, covering such matters as respect for the individual, tolerance, open-mindedness, faith in human nature, knowledge of self, sense of humor, and a willingness to work beyond the call of duty. A study of the characteristics of counselors in service suggested important considerations for selection. Nelson (56) administered an occupational characteristics questionnaire, the Kuder C.T., and the Allport-Vernon Study of Values to 302 guidance and personnel workers. Both men and women scored higher on the Kuder social service, literary, and persuasive scales. Counselors tended to rank high on the theoretical, social, and religious scales of the *Allport-Vernon Study of Values* and lower on the economic, political, and aesthetic scales. If this kind of investigation were extended to evaluation of the effectiveness of the workers studied, it would prove useful in the selection of guidance and personnel workers.

Another kind of study throw light upon the problem of selection—attempts to evaluate effectiveness of counseling. For illustration, a small sample of such reports is referred to here. Abeles (1) studied 130 counselor trainees by means of the *Differential Aptitude Tests*, the *Miller Analogies Test*, the *Graduate Aptitude Test Battery*, reading tests, the *MMPI*, and other instruments. The trainees were also rated on effectiveness by judges. Although the trainees differed sharply in some respects, their differences did not relate significantly to rated effectiveness.

Tolerance for ambiguity as measured by the Berkeley questionnaire bore a positive relationship to effectiveness of communication in counseling among trainees (12). Streitfeld (74), however, found no relationship between ratings of present and former doctoral students with regard to their acceptance of self and others and ratings of their effectiveness as psychotherapists. On the other hand, Bandura (3) found a significant negative relationship between anxiety level and ratings of competence among psychotherapists. The Professional Standards and Training Committee of the American College Personnel Association (2) enlisted the assistance of nine counselor-educators, who rated from five to 19 of their former students (a total of 105) on a scale of 18 traits and then evaluated the degree of their success as personnel workers. Though a serious effort was made to control the halo effect, it is hard to believe that the effort was entirely successful. Trait ratings and success ratings correlated significantly.

Two generalizations are warranted from these varied studies of characteristics of counselors: (a) the complexity of both the counseling process and other activities of guidance and personnel workers is too great to expect clear-cut or standardized personality definitions for effective workers; (b) evaluations of effectiveness in counseling under carefully controlled conditions, though they probably cannot provide conclusive evidence regarding traits of counselors in general, will continue to provide suggestive leads to fundamental research that is needed in the field of the

[illegible] of counselors. Berdie (11) outlined a series of conclusions regarding counseling research which indicated that systematic evaluation of the effectiveness of procedures of selection is possible.

Selection Techniques

Three studies reported the development of instruments of potential usefulness in selecting counselors. A 60-item forced-choice interest test called the *Psychological Activities Interest Record*, devised by Bentley (19), showed some effectiveness in differentiating among the interests of undergraduate psychology students including interest in counseling. Symonds (22) prepared an educational interest inventory which has indicated distinct differences between (a) counselors and psychologists and (b) administrators and principals. Keile (45), dealing with the more immediate problem of how to select faculty counselors, administered a professional activity interest inventory to 500 college teachers and devised a scoring system that effectively discriminated between teachers interested in faculty counseling activities and those with little or no interest in such work.

Serious efforts were made to examine the usefulness, for both selection and training, of group procedures which emphasized self-analysis and growth in clarification of self-understanding. One university developed a self-appraisal course for prospective guidance workers, which was evaluated by Fougner (25). Not only did this course seem to be of material assistance to those who took it, but an analysis of the students' self-appraisals provided data useful for screening future candidates.

Heist (33) utilized a group-therapy experience involving a trained therapist and 24 graduate students in counselor education beyond the master's level. Significant differences were found between the experimental group and a control group with respect to the changes judged to have taken place in the participants. Group interviews were evaluated as a criterion for selection of students by Wilson (89), who used work samples pertinent to the profession for group discussion. A small, consistent corps of faculty rated the candidates' participations and concluded that the behaviors induced were predictive of future counseling success.

The Preparation of Guidance and Personnel Workers

Guidance and personnel workers for schools and colleges are prepared in many institutions. The Office of Education's latest report (50, 51) showed the graduate courses offered in this field by 240 institutions. Great diversity was shown, one university listing 61 courses. The lack of agreement about what courses prepare personnel workers, which was noted three years ago by Stoughton (73), seemed not to have changed.

Among leaders in counselor education, however, some basic agreement appeared to be developing about the desirable characteristics of prepara-

tion programs. Many supported Derthick's plea (22) for improved quality in counselor education. Lund (46) and Williamson (88) pointed out the great need for counselor education to help candidates achieve clarification of their own values. Perhaps one of the most persistent emphases was that upon the need for counselor education to prepare people who see personnel services as integral to the educational program as a whole. Tooker (77) maintained that the counselor is, first of all, an educator. Feder (24) and Dressel (23) strongly argued for a re-emphasis in counselor education upon developing awareness of the counselor's relations with teachers and of the total educational experience of students. Warnath (82) urged that educators of counselors take cognizance, in training students in research, of the fact that most administrators value counselors more for the number of clients they handle than for their research.

Still another emphasis was upon the need for greater flexibility and creativity in counselor education. Hobbs (36) presented a most readable and convincing argument for broad, creative education for counselors. An equally convincing, though differently presented, plea for this same emphasis came from Williamson (87). Abeles (1) concluded from his analysis of the characteristics and needs of trainees at the University of Texas that flexibility and permissiveness were desirable in training programs. Fear was expressed that boards of divisions of the American Psychological Association place undue restrictions on the creativity of counselor-educators (24). Yates and Schmidt (92) concluded that counselors in training could not develop self-concepts realistically and usefully if their training were not flexibly managed.

Current Training Program: Emphases and Recommendations

The most thorough survey of preparation programs was that done by MacMinn and Ross (52). One hundred and seventy-eight institutions reported offering graduate-degree programs in guidance and personnel. One of the more surprising findings was that fewer than two-thirds of these institutions provided practicum training, although this is generally regarded as crucially necessary in counselor education. This survey dealt, as did Miller (53), chiefly with programs directed through departments of education. Miller, however, found that over 90 percent of the institutions in the Midwest offered either required or optional practicum training.

Sixteen doctoral training programs for guidance and personnel workers in the north central area studied by Wright (91) gave strong emphasis to experience in educational counseling, and all required supervised practicums. People trained in these programs predominantly entered college personnel work.

Systematic analysis of the specific aspects of preparation programs was lacking, though there was some indication that emphasis seemed to be upon the crucial role of the supervised practice experience as central

to a good preparation program. Hill (34) found this was one of the chief concerns of counselor-educators, especially in institutions in which many sought preparation in counseling in the summers, when practicums are hard to provide. Santavicca (65), surveying practicum practices, discovered that adequate practicum offerings tended to increase with size of the institution and that many programs were so new that this phase of the program had not yet been organized.

Kenyon (41) questioned guidance personnel and concluded that one of the valuable kinds of practicum experience is that of camp leadership. Hackney (30), attempting to relate counselor and client variables in the evaluation of counseling, concluded that observation of actual behavior during interviews is essential for the prediction of outcomes of counseling. A study of the opinions of 187 rehabilitation counselors (15) revealed greatest agreement on centering the educational program of counselors around counseling and interviewing rather than testing, medical information, and casework.

Several studies helped to sharpen perceptions of the role of the teacher in guidance and especially to indicate training needs of teachers who were to assume responsibilities in personnel work. Campbell (14) made a detailed analysis of the guidance work of teachers of vocational agriculture; his report on their guidance activities suggested in some detail the kinds of guidance training they need. Jenson's study (39) of how high-school students felt about counseling help indicated that students preferred the help of counselors to that of teachers, but that many teachers seemed to have developed counseling skills entirely acceptable to students. He showed differentiations in these skills.

Caravello (16) showed that, though guidance specialists seemed to get somewhat better results than teacher-counselors, the differences were not clear-cut. Counselors and teachers responded similarly to Stewart's questionnaire (72) regarding what should be done for certain types of students. Does this mean that the education of counselors and teachers should be more sharply differentiated, that education of counselors is not effective, or that we are doing well in the guidance education of teachers? Williams (86) surveyed the attitudes toward guidance and the understandings of guidance principles of a sample of elementary-school teachers and concluded that they accepted guidance principles much more than they understood them.

Evaluation of Preparation Programs

Studies evaluating training programs for guidance and personnel workers consisted mostly in the collection of evaluative opinions. Olshansky (57) surveyed 18 training programs for rehabilitation counselors and criticized them for their strong emphasis upon psychological training. Three hundred school principals in California, who were asked for their

opinions of counselor education, placed strong emphasis upon the need for field experience and intern training (47). The Education and Training Board of the American Psychological Association presented the only set of criteria for training programs published in the last three years (4). Staff criteria for evaluating content, facilities and equipment, and over-all atmosphere were spelled out, but no evidence was adduced to validate the elements that were recommended.

Two studies reported evaluations by graduates of the education program for counselors at Kent State University. Harmon (31) asked graduates to weigh the values of the various courses. Actually, all the courses seemed to have been quite highly valued. Arnold and Hummel's respondents rated the supervised practicum the most valuable experience (6).

A study of dominance of counselors (55) concluded that counselors were not as well trained in interviewing as they should have been. Stewart (70) reported briefly on an interesting kind of in-course evaluation in terms of attitude changes. A counseling seminar was shown to produce significant changes in attitudes.

Nineteen experts helped Davis (21) evaluate a set of criteria for analyzing graduate training programs for personnel work with college students. An intensive analysis was then made of one program. Baker's comparison of counselors and teachers by their reactions to "The Case of Mickey Murphy" suggested still another approach to evaluation of training (7). He showed that guidance workers and teachers can be discriminated by this method.

The report of the Professional Training, Licensing, and Certification Committee of the American Personnel and Guidance Association (3) provided a definitive outline of recommended content for training, which might well be used to help develop evaluative criteria. This report provided useful analysis of the qualitative aspects of supervised work.

Two studies utilizing the critical-incident technique clearly indicated the potential usefulness of this approach to the evaluation of the emphases in training programs. King (42) thus determined requirements for secondary-school counselors, using incidents reported by teachers. Truax (78) gathered critical incidents from guidance workers in small schools. These two studies yielded extensive lists of behaviors of counselors, classified as to areas of service.

Inservice Preparation in Guidance and Personnel Work

Though several informative descriptions of inservice projects were published, there was little research in this field. A questionnaire and interview study of six short-term institutes for rehabilitation counselors in the New York metropolitan area (83) found these to be popular programs and the participants to be pleased with their experiences in them. Kirk (43), attempting to assess the attitudes of counselors in an inservice train-

ing project, found that the counselors changed most in understanding and acceptance of their students, in awareness of the complexities of counseling, and in awareness of their own responsibilities. In another publication on this project (44), she emphasized the devices used to assess the effects of the inservice program. They consisted of an information exercise, a sentence completion exercise, an attitudes-toward-counseling inventory, and a choice test based on descriptions of counseling situations.

Clearly the field of preparation for guidance and personnel workers has not been thoroughly studied. Research is especially lacking on the effectiveness of programs that emphasize a creative and stimulating role for the counselor, rather than merely meeting on-the-job demands of the school situation. Pepinsky (60) delineated this need.

The Professionalization of Guidance and Personnel Workers

General agreement among guidance and personnel workers that they belong to a profession is evidenced by the growing strength and impact of the American Personnel and Guidance Association. Especially noteworthy was the enactment and implementation of Title V, B in the National Defense Education Act of 1958 (17). By recognizing the importance of counselor education, the NDEA re-emphasized that counseling is a profession—that is, it requires unique understandings and skills beyond those needed by teachers in general.

A great deal of concern is expressed about the improvement of the profession, but little research was done bearing on this aim. For example, the recurring assertion that guidance and personnel workers are, first of all, educators (77, 90) needs to be analyzed. No one developed the implications of this concept in terms of research, such as evaluating the roles played by counselors in schools.

Mueller (54) reminded guidance and personnel workers that they lack one of the most important justifications for professional status: convincing answers to questions about the ends sought in counseling, the ends achieved, and evidence that the methods used are truly the most feasible ones. The variety of levels of preparation of guidance workers further complicated these questions. Arbuckle (5) reminded the profession that it has not effectively defined levels of operation or of training.

Status of the Profession

The question of how the profession appears to others was not thoroughly examined. The fact that two recent publications of the federal government (79, 80) provided descriptions of the school counselor suggested that the counselor's function in schools had achieved wider recognition and that

the position had become better defined. There seemed not to have been a clear, consistent, and strictly "professional" view taken of what the duties of guidance workers should be (61, 64, 76, 81, 85). Routine, administrative, and punitive responsibilities were regarded by some of those defining the work of the counselor as appropriate for him to assume. Encouragingly, a study of expectations of highly trained college personnel workers with regard to their role showed a high degree of agreement (32). The duties and expectations of counselors in small colleges where personnel programs had been recently originated were shown to be closely related to teaching duties and not classified uniformly (62).

Psychologists rated rehabilitation counselors and high-school counselors below counseling psychologists in prestige (29). Counseling psychologists were rated below professors of psychology in large universities, and below clinical psychologists. The hierarchies seemed to reflect levels of training.

The idea that the prestige of counselors might be enhanced by raising training requirements was set forth (40). It was also pointedly suggested that the future status of the profession would depend heavily upon the quality of its current services (20). Still another approach was that of seeking to define the rights of school counselors, in part as a means of improving their status (71).

Some pessimism was expressed about the future of the profession. Cowley (19) remarked the tendency to make appointments to key personnel positions for reasons having little to do with preparation for such duties. Feder (24) wrote of the future of the profession as "clouded" because of lack of clarification of ethical standards, failure to define functions, and lack of self-policing. Pepinsky (59) proposed that the American College Personnel Association loosen membership requirements as an aid to wider acceptance and enhanced status.

Supply, Demand, and Economic Rewards

The most comprehensive recent data on supply and demand in the field of counseling and guidance were compiled by MacMinn and Ross (52). Institutions reporting to them indicated demand in excess of supply, although no attempt was made to estimate the possibility of duplication of reports of vacancies. Paradoxically, significant numbers of those who had master's degrees in guidance were not engaged in positions related directly to their training. A 1957 national survey (38) indicated a sizable increase in number of people qualified for high-school guidance positions. Hitchcock (35) drew on several sources of data in concluding that the number of people engaged in secondary-school guidance work was increasing rapidly.

Weitz (84) contended that "many" more qualified persons would be available for school counseling if the requirements of teacher preparation and experience were removed, but did not adduce evidence to support

this contention. He did report opinions of state guidance supervisors to the effect that a shortage of counselors exists in most states.

Stevens and Hoppock (68, 69) reported data from one university's placement department on the number and kinds of positions that exist in the field of counseling. School counselors were paid on a sliding scale related to training and experience and were given an increment beyond the teacher's scale. Purcell (61) showed that school counselors on Long Island were in a salary bracket above that indicated by Stevens and Hoppock's surveys (67, 68, 69). Rosse (63) reported that vocational rehabilitation counselors commanded salaries comparable to those of vocational-disability examiners.

An interesting, but as yet unexplained, aspect of the economic status of the profession was the effect of economic subsidies at the training level. McCully's analysis in the Veterans Administration counselor-training program (48) indicated that subsidies would raise the training level. The annual report of available financial aids for counselor education (18) noted that 142 institutions provided such aids.

Certification of School Counselors

Certification required by state departments of education has been used as one index of level of preparation of guidance workers. The latest Office of Education report on certification (13) showed that 34 states required certification, whereas certification for school counselors was optional in seven states. Fourteen states added training requirements for school counselors after 1951. The nature of the state certification requirements varied widely. It is also to be noted that many school counselors did not hold certificates (40, 85), even in states where certification was supposed to be mandatory.

Professional Ethics

One substantial study of the ethics problem was reported, that of Smith (66). She obtained the reactions of 600 professional members of the National Vocational Guidance Association regarding ethical problems involved in the use of counseling information. She also summarized legal findings from the several states. Thirty-seven states had no law or ruling which permitted the counselor to withhold information received in confidence. An excellent volume on the legal and ethical responsibilities of school personnel (26) unfortunately gave little attention to the responsibilities of the counselor.

Truax (78), studying critical requirements for counselors in small schools, identified a series of critical incidents illustrating what he called "professional responsibility" and "personal responsibility." This constituted, by use of the critical-incident method, a promising means of identify-

ing ethical requirements. A proposed code of ethics in administering vocational guidance services to the public was prepared by Goberis [27].

Summary

Research on the selection, preparation, and professionalization of guidance and personnel workers is, and has been, disappointingly limited in scope and intensity. One gets the impression that perhaps the most severe handicaps to such research have been (a) lack of certainty as to ends sought, (b) lack of basic studies evaluating guidance practices, and (c) failure to communicate research findings through professional publication.

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CHAPTER IV

The Counseling Function

HERMAN J. PETERS and WILLIAM J. MUELLER

Definition of the field of counseling, as distinguished from guidance and psychotherapy, continued during the period covered by this review (4, 46, 54, 56, 57). Two related approaches to definition were observed. One effort to fix boundaries of the counseling field placed it on a continuum according to the degree of affective involvement. In this lies danger that theory becomes the province of the psychotherapist and only surface applications are made by the counselor. A second approach was made in terms of where the interview takes place: in a school, it is guidance; in a counseling center, counseling; in a clinic, psychotherapy. Despite attempts to define counseling as leading to acceptance of one's personality attributes and the best use of them, and to define psychotherapy as efforts toward basic personality change, counselors of all persuasions have not effected a commonality for the meaning of counseling.

The counseling function needs definition for many reasons. Recent attempts in California and in Ohio to enact legislation call for a definition. The impact of counseling and guidance institutes under the National Defense Education Act necessitated some working definitions. Hydra-headed approaches to the problem may result in lessened public approval of the role of counseling in assisting students and youth. English and English (14) observed that "goodness of terminology is not merely statistical, it is psychological and social. Our goals are clarity of thinking and effectiveness of communications. Misleading terminology does not become better by being widely diffused; it merely does greater damage."

The persistent dilemma with regard to terminology is well stated by Peltz (43): "Guidance work may be conducted by homeroom teachers, advisors, or trained counselors, and may involve working with parents as well as with students. The difference between guidance or counseling on the one hand and psychotherapy on the other is a hard one to define precisely. In general, however, it can be said that the former is more apt to be concerned with external situations or factors dealing primarily with conscious material and usually lasting a short time whereas psychotherapy deals with internal conflicts as well as conflicts with the external world, handles unconscious factors as well as conscious material, and is frequently of fairly long duration."

Theoretical Considerations

No new formulations were found, nor were there any major polemics about directive versus nondirective counseling. Yet, theoretical considera-

tions received their fair share of attention and focused on the total concept of guidance, personality, the counseling process, and counseling in relation to particular psychological and sociological problems.

Beechy (3) developed a theoretical framework of guidance through an analysis of adjustment, individualization, socialization, vocation, and love. His conceptual framework offers a broad sociopsychological screen against which the counselor may project his counseling functions. Looking at the problem somewhat differently, Masserman (34) pointed out the essentials in a large, encompassing, and responsible base for the counseling function in analyzing (a) the maintenance of the scientific prestige, (b) ethical integrity, and (c) social influence of allied professions.

Thorne (55) pointed out the importance of periodic examinations of various theoretical foundations of counseling and discussed psychoanalytically oriented therapies, client-centered counseling, disciplinary counseling, and the semantic impact on counseling. This article is recommended as a provocative stimulus for students and scholars to analyze the similarities of, and differences between, various theoretical bases for counseling. Thorne's view was also expressed by Lewis (30).

Fundamental principles of counseling theory were considered in terms of man's integrating relationship between mind and body (35), clarifying dogma or a set of principles involved in having a theory (4, 5), thinking through one's theory of counseling (60), and counselors' values operative in the helping relationships (19). Patterson (39) argued for a systematic view of counseling theory rather than an eclectic perspective. Various writers emphasized a particular bent in looking at the counseling function, such as the place of limits (18), the therapeutic effort (67), the impact of culture (51), counseling for personal adjustment (33), the vocationally handicapped (32), the emotionally disturbed (40), the interview with emphasis on communication (25), and multiple counseling (12).

Prompted by analysis of the writings on counseling and adolescent development, Peters and Farwell (45) urged a study of principles and procedures in the secondary- and elementary-school settings. They remarked that the following factors may necessitate modification of current counseling theory and procedures when applied to the pupil in the school setting: (a) differential factors of maturation level of pupils, (b) school organization, (c) concept of authority in the school setting, (d) involuntary nature of the counseling process, (e) the kind of limits which may be set on counseling, and (f) the professional education of the counselor. Books on guidance at the elementary-school level gave considerable space to counseling (28, 29), but their material was vague and unsubstantiated by research or theoretical models applicable to the child.

The Determinants of the Counseling Process

The studies in this section are classified according to the variables which the researcher was interested in isolating. Articles that were not strictly

experimental in the sense that they relied heavily on the author's intuition are included, since they differed from others only in the degree to which the author was able to specify and subject his clinical observations to rigid tests of his hypothesis. Studies clustered around (a) the person of the counselee, (b) that of the counselor, and (c) the interaction between counselee and counselor.

The Counselee

Subsumed under the first heading is a group of studies about counselees' expectations of counseling and satisfaction with counseling. Solely on intuitive grounds, one would expect a strong positive relationship between congruence of counselee-counselor concepts of what counseling ought to be (expectations) and counselee satisfaction. The conflict evident in the studies reported below supports Rogers' statement (50) that the area of client expectations is one of the least understood in the counseling process.

Operating solely within the framework of the counselee, Grigg and Goodstein (21) attempted to evaluate the outcomes of counseling in terms of such evaluations by the counselee of the counseling process itself as his feelings of comfort and his appraisal of the counselor's activity and participation. As defined by response of counselees to two questions about the number of opinions, suggestions, and interpretations that were given by the counselors, counselees seemed to prefer a counselor who was more directive.

Utilizing a sample of high-school seniors, Sonne and Goldman (52) sought to determine whether clients with authoritarian or equalitarian personality structures differed in their responses to client-centered or eclectic counseling. The "unpredicted preference of . . . three groups for the eclectic over the client-centered interview" seemed to be one source of stimulation for a series of critical comments and replies regarding the use of the client's satisfaction as a criterion in evaluating the outcomes of counseling.

Patterson (37), arguing that the counselee's expectations were a function of his social conditioning, questioned the advisability of the counselor's acquiescing to the student's dependency need rather than continuing to work with the counselee toward such an ultimate goal as the counselee's acceptance of responsibility. This same issue recurred in Patterson's recent text (39), and it is clear from the way in which the problem was handled that the author recognized the strength of the cultural learning question involved. Responding to Patterson's study, Goodstein and Grigg (20) contended that, although multiple-criterion measures are necessary, client satisfaction is a valid criterion for evaluating counseling success.

A different point of view, but one affected by the same issue, was presented by Froehlich (17) in a recent summary of studies, principally multiple-counseling research. The general counseling objectives advocated

by Froehlich, as revealed by these studies, were to provide relationships which maximized counselee participation and minimized counselor-centered activities.

Nelson (30) attempted to refine the use of client satisfaction as a variable by examining its relationship to vocational maturity. Results of aptitude tests and inventoried interests constituted the experimental variables with which the criterion variable was correlated, and vocational maturity as defined above was found to be related to reported satisfaction with counseling.

Other studies attempted to relate outcomes of counseling to the personality structure of the counselee. Cartwright (10) applied the *Rorschach Prognostic Rating Scale* to the 13 clients' pretherapy Rorschachs and, with reasonable success, predicted the successful client from response patterns. Utilizing rating scales derived from a pretherapy *Thematic Apperception Test* and a first interview, Kirtner and Cartwright (27) extended this kind of research into a second dimension and found a relationship between the client's personality structure and the length by outcome of the interview. Wrenn (66) reviewed the growing body of research on self-perceptions and interpersonal perceptions, especially as these studies relate to growth through counseling. Cartwright (8) presented an excellent current accounting of research, methodology, and theory construction in client-centered therapy.

Cartwright (9) hypothesized that counseling increases the consistency of the self-concept which one brings to varied situations involving interaction with other persons, that is, the person's "self" would have been enlarged. A Q-sort technique revealed less item variance after therapy. Of special interest are the implications of the finding that for the successfully counseled persons, the increase in consistency came from pretherapy low-relevance items that had changed to high-relevance post-therapy.

Using as a counseling criterion the shift in the discrepancy scores between counselees' self-ratings and such external measures as test and inventory scores, Froehlich (16) found a significant shift in the direction of increased self-knowledge in a counseled group with whom the counselor interpreted test data.

The Counselor

Other studies were directly concerned with the effects of the counselor's personality, behavior, or training on the outcomes of counseling. Weitz (63) set down security, sensitivity, and objectivity as three personality characteristics that a counselor ought to possess.

According to Weitz, the secure counselor accepts himself and others. His acceptance of others flows from his self-acceptance, and it is the basic stuff on which sensitivity thrives. Lastly, the objective counselor is aware of such distinctions in counseling as those between the person and the norm,

the label and the behavior, the symbol and the object. Similar characteristics were cited by Rogers (49) as the guidelines of a helping relationship.

Operating within the framework of the discussion unit proposed by Robinson (45), Weeks (62) attempted to circumvent the difficulties experienced by Dipboye (11) in classifying counselor style according to the dimensions of previously proposed schemata. In Weeks's system, the style of counselor is plotted against an analysis of the content of the discussion unit in terms of the level of affect involved. A significant finding of the study was that the counselor's style differed between high affect and moderate or low-affect discussion units; a wider range of responses was evinced by the counselor at the level of high affective involvement.

Poole (47) compared judgments by counselors and by typescript-readers of the counselor's objectives in counseling and the achievement of these objectives. Apparently the readers and counselors judged consistently in terms of their own interpretations of the goals of the counselor and the achievement of these goals by counselees, but the interesting phenomenon was that these systems were independent. Poole contended that, had she utilized a research design in which evaluation of outcomes had been made solely in terms of readers' judgments of the achievement of counseling goals, she might have concluded that counseling was successful.

Whereas the research has often been directed at the expectations of clients, Truax (57) investigated the expectations that administrators, teachers, counselor trainers, counselors, supervisors, and state directors of guidance have of small-school counselors. Although Truax's completed job analysis revealed a strong emphasis on the counselor's duty to individual students, the study indicated that the counselor is also perceived as a resource person with major school and community responsibilities. King (26) confirmed this concept of the counselor in a study of behaviors used by teachers to differentiate between effective and ineffective counselors. It is worthy of note that the critical-incident technique proposed by Flanagan (15) has been applied in both these studies. In still another instance, this same technique was used by Eilbert (13) as a semantic tool to reclassify the meaning of emotional immaturity.

Brams (7) compared the scores made by a group of counselor-trainees on a *Communication Rating Scale* with their scores on a series of personality and interest inventories. A positive relationship was found only between the trainees' tolerance for ambiguity (Berkeley Questionnaire) and their effectiveness in communication.

Arbuckle and Wicas (2) attempted to develop a free-response appraisal instrument to measure the agreement between the counseling orientations of counselor-trainees and expert counselors. Because all but one of the items measure accurate clarification of feeling, other aspects of the counseling relationship are ignored and the instrument's usefulness is limited.

In a stimulating presentation, Horst (23) differentiated between the actuarial and other nonintuitive views in counseling evaluation as one of

degree, not kind. The essential evaluative problem centers around the counselor's willingness to "specify the factors which he takes into consideration in making a prediction."

Editors allotted considerable space to philosophical issues, especially to questions of value orientation in counseling. Perhaps, as Walters (61) has suggested, psychology's scientific antithesis has been fulfilled, and a synthesis of philosophical issues is in order. Regardless of their orientation, counselors seem agreed that the value structures of the counselor, *ipso facto*, become a part of the counseling process (1, 39, 42, 64, 65). This seems to be a departure from popular misconceptions of theorists' positions, rather than from the positions themselves. At any rate, the articles reflect a need for clarification of some philosophical bases of counseling. The issues generally center around (a) what the counselor's values ought to be and (b) whether these values ought to be consciously imposed. The second issue quickly dissolves, however, when the discussants come to terms on what the value orientation of the counselor ought to be, since the nature of the acceptable counselor-held values is incompatible with the imposition of lesser values.

The Interaction Between Counselee and Counselor

A growing concern was shown (6, 22) for a need to study the interaction between counselor and counselee in the counseling relationship, despite the required complexity of research design and multivariate analysis. Gustad (22) has nicely stated the problems involved in this kind of research, and his own work (58) reflects an attempt to meet the need for research in counselor-counselee interaction. Tuma and Gustad (58) studied the effects of difference of personality characteristics of client and counselor on self-learning. They found that the amount of client self-learning was related to the existence of an original similarity in the personalities of counselor and counselee on three of the selected personality traits. As interesting as the article itself was the critique of the research design by Pepinsky (44), who commented that the methodological question was logically prior to the substantive one in the interpretation of research studies.

In an over-all summary of findings of a 15-year, three-phase integrated program of interview research, Berdie (6) emphasized the need for a research design that allows for an analysis of counselor-counselee interaction at many levels.

The fuller analysis by Patterson (41) of methodology in research on counseling ought to be studied carefully for its implications for determining whether the results of counseling research can be trusted and its findings put to use. The same research-design theme is repeated in another article by Patterson (38) in a consideration of his own research on counseling.

Lifton (31), in an intriguing study, reported on the relationship of empathy to aesthetic sensitivity. Despite the many problems encountered,

this attempt to establish the validity of the criterion variable of empathic ability in some way other than through such an external agent as the consensus of judges deserves recognition. Lifton correctly recognized empathy as a *relationship*, thereby calling into question the usual self-description-prediction methodology as a means of measuring empathic ability.

Utilizing interview data from the Career Pattern Study (33) and operating within a definition of the appraisal interview as one whose purpose is to learn about the counselee, Hummel (24) attempted a content-analysis of the data. He found that the utterance category in which the content of the previous communication was reflected received highest rank among the prediction weights for responsiveness.

Summary

There is increased awareness of the need for adequate research design on interaction between counselor and counselee. Significance of contributions to counseling research may be a function of the number of variables that can be handled by the investigator in an unstructured counseling contact.

High-school populations furnished an increasing number of subjects for counseling studies. Perhaps this is the most important development reported here. It will be interesting to note whether modifications of counseling theory may result from increased controlled observation at the school-counseling level.

Finally, philosophical issues in counseling received considerable attention. Generally, discussion of the question of "neutrality" in counseling has been replaced by an examination of the nature and strength of the impact of the person of the counselor on the counseling relationship.

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CHAPTER V

The Use of Appraisal Data by Guidance and Personnel Workers

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Though progress has been made in test theory and test validity, there remains a disappointing lack of attention to the problem of practical application of appraisal data. Users of such data are largely teachers, administrators, and guidance workers. Too frequently they are required to utilize test data with minimum technical understanding. The potential richness of the data is missed because of their limited training and the pressing necessity of using every means at hand to cope with problems which require immediate, practical solutions in the best interests of the student.

Unless the personnel worker keeps before him the multiplicity of factors that temper and shape the interpretation of test data, his efforts will yield little to further his understanding of the client or the client's understanding of himself. Since the enactment of the National Defense Education Act of 1958, test data have taken on even greater significance. Large-scale testing programs are under way in many schools that have not heretofore employed objective measuring instruments to any extent.

Identification of Talent

The current emphasis on identification of the talented is reflected in the studies reporting the characteristics of such youth. Anderson, Tate, and Smith (3) studied a number of such characteristics in a large sample of high-school seniors. After considering the possible influence of variables, such as school size, academic subjects, and sex differences, they concluded that an acceptable criterion for exceptional performance other than the intelligence quotient must be sought. Arnold (5) and Liddle (22) supported the view that test scores are a foundation upon which one builds, not a finished end product.

In a review of current appraisal procedure, Super (35) observed four steps in the process: (a) obtaining data about the client, (b) drawing inferences from the data which help develop a picture of the client, (c) establishing hypotheses derived from the inferences, and (d) making predictions of future behavior. If one accepts these as basic elements of the appraisal procedure, he will probably admit that the two intermediate steps represent the difference between effective utilization of knowledge and educated guesswork. Many people can accumulate data, and, in practice, the guidance worker too often immediately proceeds to the predictive phase, neglecting the potential effectiveness of the data and invalidating the economy of any prediction.

Arnold (5) found that, of a sample of college freshmen who had completed the *Kuder Preference Record* while still in high school, one-fourth had never had any discussion of their test results; he found a great deal of confusion regarding the differences between interest and aptitude. Arbuckle (4) discovered a lack of agreement between self-perceptions and scores on personality inventories. Thomas and Mayo (36) investigated the influence of added attention to the intermediate steps of the appraisal procedure. Predictions of counselors were enhanced by the added perspective provided by the investigators. McCabe (23), Faries (10), and Coleman and Collett (7) offered further suggestions for increasing the utility of test data.

Test Selection and Interpretation

Considerable attention was given to the selection of tests and interpretation of test results to clients. Proponents of the several theoretical approaches sought to substantiate the relative superiority of their methods. Gustad and Tuma (13) compared various methods of selecting tests and interpreting data with respect to client learning. No differential effect was found in intelligence, reading, or vocational interest. They concluded that the initial accuracy of self-perception is not related to intelligence and saw no relation between scholastic aptitude and client learning relative to the self-concept in the counseling relationship. It would appear that personnel workers could profitably spend more effort on improving interpretive skills and less energy justifying the excellence of a particular theory of counseling.

Personality and Scholastic Aptitude

A number of investigators—Liddle (22), Stone and Ganung (34), and Altus (2)—turned their attention to the relationship of personality to scholastic aptitude. Scarf (30), studying the differential between the Q and L scores of *ACE Psychological Examination* for indications of emotional problems, found a high incidence of poor academic achievement and emotional disturbance among the group whose Q-L score differential exceeded the median of 16 percentile points. Holland (16) concluded that success in college can be predicted more effectively if measures of scholastic aptitude are combined with personality measures and suggested the possibility that college achievement is the result of a general cluster of personality and aptitude variables.

Vocational Interests

Vocational interests were studied in a variety of contexts. Stewart (32) examined the effect of the client's knowledge of aptitude test scores on the

stability of measured interests. His finding that the knowledge did not produce significant changes appeared to support the results of other studies reported in this review. Knowledge about the self in the absence of opportunity to integrate the information actively into the concept of self does not produce observable change. Hill and Rogge (15) found further evidence of the disparity between man's cognitive and conative components in their study of the relationship of interest test scores to mental maturity measures. Patterson (27) studied the nature of interests and occupational choices in the emotionally disturbed. Hoyt and Kennedy (17) studied the differences in interests between women oriented toward careers and those oriented toward homemaking.

Inventories of interests were employed in several prediction studies with varying degrees of success. England and Paterson (9) concluded that their data supported a recommendation of increased utilization of measured interest scores in the selection and classification of certain military personnel. King (19) examined the possible value of 12 kinds of data for the prediction of interest-profile stability. On the basis of data studied, he held that factors such as age and marital and socioeconomic status were not useful in predicting stability of the profiles obtained from the *Strong Vocational Interest Blank*. Motto (26), using scores on the *Kuder Preference Record* in an attempt to predict success in vocational school, found that the trainees produced essentially flat profiles and that none of the scales could be used to differentiate successful from nonsuccessful students. Cooper (8) and Stewart (33) sought additional information to add to the data now available regarding the *Strong Vocational Interest Blank*.

Vineyard (38) studied the influence of academic ability and interest on the choice of a college major in science. He stated that the *ACE Psychological Examination* Q-score yielded significant information about the kind of ability important for success in science and that scientific and computational scales of the *Kuder Preference Record* were indicative of the prerequisite interests. He concluded that, though the field of science attracts more than the expected proportion of majors, many more students in college could successfully pursue scientific study. These students constitute a reservoir of talent that would respond to efforts directed toward the development of scientific interests. Socioeconomic status was found to be related to interest-inventory scores by Pierce-Jones (28). Males from upper socioeconomic groups showed positive correlations between IQ grade point average and Literary, Musical, Persuasive, and Scientific Scales of the *Kuder Preference Record*.

Personality Tests

Coleman and Collett (7) succinctly pointed out the status of research using structured tests of personality. Sopchak (31), comparing the *Minnesota Multiphasic Personality Inventory* (*MMPI*) scores of college students

and their parents found the scores of the parents similar to each other and different from those of their children. The *MMPI* was used to distinguish delinquent from nondelinquent boys by Rempel (29) and the items of the *California Test of Personality* were studied by Mitchell (24) in an attempt to differentiate between subjects of high and low socioeconomic status. Ullmann (37) combined teacher ratings, peer ratings, and test scores in order to predict adjustment. He found that self descriptive personality test scores were useful in predicting dropouts among females. The interesting relationships between 15 variables on the *Edwards Personal Preference Schedule* obtained by Allen (1) led him to question the claimed independence of these variables.

Research on personality traits over the last three years has raised more questions for the personnel worker than were answered.

Achievement and Aptitude Tests

Of all the areas of measurement influenced by the National Defense Education Act, achievement and aptitude testing has probably felt the greatest impact. The possibility for systematic research in this field extends far beyond the original provisions of the Act. The studies reported in this section include a narrow selection confined to the realm of academic aptitude and achievement. A more detailed treatment of specific aptitudes by Guilford, Fruchter, and Kelly (12) covers the same period of time as the current review.

Henderson and Masten (14) reported on six predictors of college achievement, and Webb (40) employed five in his study of first-year students of dentistry. In another investigation of college students, French (11) found the high school record more useful for predicting over-all freshman grades than the quality of work in the major field. Belai (6), Kennedy (18), and Vineyard (39) also worked with the problem of prediction of achievement at the college level.

Layton and Swanson (20), comparing scores on the *Differential Aptitude Tests* at grades 9 and 11, found the Verbal Reasoning Score the best single predictor of eleventh-grade test scores and high-school rank. *High School General Educational Development Test* scores were analyzed by Leton (21). Wellman (41) compared the predictive values of single scores and results of multiple factor tests of mental ability.

Wilson (42) and Mohandessi and Runkel (25) sought additional information to add relevance to test results. The former studied the effects of various educational environments upon achievement, and the latter investigators examined some of the socioeconomic factors associated with academic aptitude.

It appears that in achievement testing and academic-aptitude testing the profession is moving in the direction of more effective utilization of the data.

Summary

Although continued interest in the use of appraisal data is demonstrated by the research during the period of this review, it is also evident that such research raised many questions and did little to clarify issues basic to guidance and personnel workers who use appraisal data in many practical ways in giving students help. For example, in test interpretation, there is a growing body of respectable research on predictions for such purposes.

On the other hand, it is difficult to find significant research on the use of appraisal data in the counseling interview. Research has all too frequently stressed the use of appraisal data as a mechanical and rational procedure rather than a complex process with both cognitive and conative dimensions. In other words, because of the personal affect inherent in the acceptance or rejection of appraisal data by the client, research designs will have to take account of, not only what data are used or learned by the client but also why they are, or are not, acceptable to the client. Perhaps only practicing counselors will be able, or inclined, to design and carry through this type of research.

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CHAPTER VI

Occupational and Educational Information

RICHARD M. RUNDQUIST and ROBERT APOSTAL

IF RESEARCH in the area of occupational information during the last three years is to be characterized, it is to be described as continuing and enlarging the emphasis on achievement of a further understanding of career and occupational psychology. A quick perusal of the bibliography will show a majority of studies devoted to these subjects. This emphasis is owing, not to a bias of the authors, but to their response to the need for answers to some vital questions. It appears that occupational information is achieving a more meaningful relationship with the other aspects of counseling and diminishing emphasis upon mechanical aspects of collecting and disseminating information.

The Psychology of Occupations

The change in emphasis from the mechanical organization of occupational materials to understanding the meaning of work in terms of human behavior is illustrated by such books as those of Super (64) and Roe (57). Super presented a theory of vocational development based upon Charlotte Buehler's previous theory of life stages. In an earlier article Super (65) presented vocational development as the implementation of a self-concept and the "means of self-realization." He (63) also took to task, to some extent, the public secondary school for orienting children toward middle-class vocational conceptions, to the neglect of the needs of the 40 percent who become semiskilled or unskilled workers.

Herzberg and others (33) significantly reviewed the research concerning attitudes of employees. Their review contained about 2000 references from a variety of sources. Robinson (53, 54, 55) continued his yearly reviews of the research on job satisfaction.

Of a more specific nature was a report, in a book by Gross, Mason, and McEachern (30), of a systematic survey of role perceptions among public-school superintendents and school-board members. Super and Bachrach (66) produced a series of 12 propositions bearing upon a theory of vocational development, with emphasis on the development of choice among scientific careers. Holland (34), posing a theory of vocational choice, suggested that choice is based upon the interaction of a person's heredity and environment: the person develops a "hierarchy of habitual or preferred methods for dealing with environmental tasks" and makes a vocational choice based upon his desire to satisfy this "hierarchy of adjustive orientations."

It has been stated that Roe's formulation of a theory of vocational choice (57) contains hypotheses enough to keep the counseling psychologist busy for years to come, but the only specific test appeared to be that of Grigg (29), which failed to find a difference between 20 graduate nurses and 20 female graduate students in chemistry, physics, and mathematics in terms of their early experience with parents. There would appear to be a serious question, however, whether a comparison of these two groups constitutes a test of the hypothesis.

Patterson (50) indicated a belief that the various theories of vocational choice have some limitations when applied to the emotionally disturbed, because of the strong influence of emotional needs in this group.

French (25), in a longitudinal study of 232 Harvard undergraduates tested 12 years previously, found relationships between their prospective occupations and the measures used which indicate that there are factors in effect long before a person enters an occupation which tend to direct him toward that occupation and away from others. One criticism of this study concerns the validity of some of the measures used.

The question of occupational stereotypes is one which has long interested those concerned with vocational choice. Walker (70) found a correlation of 0.79 between the degree of stereotype and the order of preference for the occupation.

Writings by sociologists also contained an increasing number of references to research bearing upon questions of occupational psychology. Strodtbeck, McDonald, and Rosen (61) reported a study of the differences in mobility between people of Jewish origin and people of Italian origin, which showed the Italians more accepting of occupations of lower status. Mack (41) reported individuals in unskilled jobs likely to define life goals in monetary terms, while individuals in more determinate occupational roles were found likely to view their work as an end in itself. Carper and Becker (10) found that conflict centered around disparities between parental and occupational expectations, rather than being a result of assuming an occupational identity.

Danskin (14) summarized some of the literature on the sociology of several occupations. Merton, Reader, and Kendall (42) edited the introductory publication of an extensive sociological study of 30,000 men and women students in some 80 medical schools. The study was concerned with the process of acculturation within a professional school.

Occupational Classification

A satisfactory classification of occupations has long been sought, and some new attempts were made. Outstanding were those of Roe (57), Super (64), and the United States Employment Service (USES), as described by Fine and Heinz (21). Super proposed a threefold grouping by level, field, and enterprise. The USES system also was threefold, classifying (a)

what workers do and worker traits; (b) the work done; and (c) materials, products, subject matter, and services. Newman and Fine (46) reported on the validity of ratings of physical requirements and working conditions made from occupational information rather than from direct observation. Fine (19) also reported the trait requirements for workers that were related to the *Minnesota Occupational Rating Scales.*

A preliminary publication of the USES, *Estimates of Worker Trait Requirements for 4,000 Jobs* (69), was described by Fine and Heinz (20). Hall (31) suggested that the multiple-discriminant function may be a "systematic way of defining occupational families." Remstad and Rothney (52) attempted to show that the type of occupational classification used in research to a large degree determines the results of the investigation; they indicate the need for better occupational classification.

Social Status of Occupations

As evidenced by the number of studies, the question of occupational prestige, or social status, remains a primary concern of researchers. Kunde and Dawis (37), exploring the subject in Germany, the Phillipines, and the United States, found that in all three cultures the social status of occupations "follows a predictable pattern with professional and managerial occupations ranked highest and unskilled occupations ranked lowest, with 'white-collar' occupations ranked higher than 'blue-collar' occupations." Adcock and Brown (1) in England pointed out that there is no widely accepted frame of reference for the social grading of occupations and that most individuals find their own; consequently, they questioned whether occupation, if not rigorously defined, is a meaningful approach to the study of social class.

Using high-school students as subjects, Folsom and Sobolewski (23) found a high correlation between estimates of income of occupations and ranking in social status. In a sociological study, Dyer (18) found that children's attitudes toward work are similar to the attitudes of parents, and children of the better satisfied "white-collar" workers have a more positive attitude toward the parental occupation than do children of the "blue-collar" workers. The educational and occupational aspirations of college students from nonfarm families were found by Sewell, Haller, and Straus (58) to be a function of the family social status over and above, but not exclusive of, the factor of intelligence.

Tuckman (68) attempted to modify the social-status rankings of occupations by giving the job description in addition to the job title and by giving the job description only. He found only a small change in the rankings and interpreted that finding to indicate a fixed idea by the individual about the rank of an occupation. Stefflre (59), in an elaborate investigation of the nature of the social status of occupations, studied 10 factors for 20 occupations and subjected these to centroid factor analysis. A global

factor accounted for most of the intercorrelations in the matrix, and he concluded that some other approach is necessary for the study of this problem.

Two other studies related to this problem were those of Minor and Neel (43) and Hammond (32). Minor and Neel (43) obtained McClelland's achievement-motive measure on 50 Korean veterans and related this to a prestige ranking of occupations. They found a significant positive relationship between achievement motive and level of occupational preference. There was no difference in occupational ranking by those of very high, moderate, and very low *n* achievement scores. Those who had moderate and very low *n* achievement scores tended to be more realistic in occupational preference than those with very high scores. Hammond's study (32) of college freshmen yielded four tentative factors: economic-status, personal-status need, structure need, and acceptance need. It supported the hypothesis that above-average scores in a measurement of needs are positively related to the choice of certain vocational areas.

Women's Occupational Roles

Probably the most intriguing classification of women's roles was proposed by Super (64). He proposed seven patterns: (a) stable homemaking career; (b) conventional career; (c) stable working career; (d) double-track career; (e) interrupted career; (f) unstable career; and (g) multiple-trial career. Further research to test this system of classification and to answer some of the questions propounded by Super's discussion is needed.

In a restricted sample of 86 upper-middle-class married women, Gass (26) found that pursuit of additional interests was needed even during the time when homemaking and child-care demands were fullest. She also found a striking lack of awareness of unmet needs. Ostlund (48) found in a sample of Negro college women that by age 12 the general choice of an occupational area was decided and by age 15 a specific job decision was made. Although these studies were quite different in population and design, they illustrate two fundamental questions. First, to what extent can older women revive old, or develop new, interests and thus find a more acceptable role in society? Second, to what extent do the culture and opportunities deriving from that culture predispose women to early, stable choices? Cross-sectional and introspective studies can hardly provide the answers.

Vocational Choice

With a sample of 1000 ninth-grade students, Stephenson (60) studied realism of vocational choice and concluded that occupational aspiration

may not be realistic but that occupational planning is clearly more realistic than is often assumed. This problem was also examined by Lockwood (40), who used a stratified random sample of 508 high-school graduates. His results indicated that realism in vocational preference appeared to be an individual, rather than a "group-attached," phenomenon. Bentley and Hemp (6) sought to determine (a) the factors which influence college students of agriculture in the choice of specialization, (b) when the choice is made, and (c) satisfaction with the choice. Two-thirds decided on their specialization before entering college; seniors who made a choice before entering college indicated somewhat more satisfaction than those who chose later. Family, friends, and teachers influenced choice most.

Chervenik (11), questioning the concept of freedom of occupational choice, believed a great many factors operate to restrict choice. She pointed out that counselors themselves may limit freedom by passing on slanted information, or they may be influenced by occupational recruitment drives. The complexity of the process of occupational choice was also brought out by Drasgow (16). Finding that almost 100 percent of former University of Buffalo students who were studied listed more than one reason for making their particular choices, he contended that this fact reflects Freud's principle of overdetermination. The inference is that counselors counseling students with vocational problems would do well to explore all reasons for making a particular choice.

Sources of Occupational Information

Two major works on the nature and use of occupational information by Baer and Roeber (4) and Hoppock (35) were revised. The *NVGA Bibliography of Current Occupational Literature* (45) was also revised. Goldstein (28) described the 1957 edition of the *Occupational Outlook Handbook* and its advantages over previous editions. Gates (27) appraised the materials supplying occupational information in the library of a local employment service office. Kuntz and Jetton (38) reported the results of their study of the use and appraisal of 52 sources of occupational literature by secondary-school counselors. Mitchell (44), discussing trends and developments in the labor force and their implications, treated shifts in employment, occupational trends, "blue-collar" occupations, and educational requirements.

Several articles provided information on specific groups of workers: the older worker (47, 67, 72, 73), the blind (2), and the Negro (3, 36).

Wolfbein (72) presented some factual and theoretical background on the problems of the older worker from the point of view of the guidance worker and attempted to answer pertinent questions. Young (73) described the Bureau of Employment Security's studies designed to develop and test methods of improving and expanding employment counseling and job-placement services to older workers. Thompson (67) set forth

several reasons for the positive correlation he found between length of time in school and total wages earned over a lifetime. His study, undertaken to assemble information on requirements for manpower and opportunities for work, is valuable to those concerned with older people in the work force. Odell (47), reviewing research on the older worker, believed prejudice and discrimination are unfortunate obstacles which deprive the older worker of his rightful place in the work structure.

Surveying the vocational objectives of 493 blind college students, Asenjo and Axelrod (2) found that 30 percent were headed toward teaching, 12 percent toward social work, and 11 percent toward law. They included data on certain characteristics of blind public-school teachers and on ordinances bearing on employment of blind teachers.

Augustine (3) related the changes in Negro employment during the 1940's to the goal of equality of opportunity for employment and offered a tentative definition of equality in employment. Kiehl (36) discussed opportunities for Negroes in engineering and concluded that discrimination has decreased to a point at which Negro youths who have interest and aptitude should be able to find careers in engineering.

Peters and Drumm (51) described the relatively new occupation of human engineering, providing basic information on duties, requirements, job titles, recommended academic preparation, salary levels, current status of the field, and possible future needs.

Uses of Information Materials

Several articles reviewed under this heading might well have been included in the preceding section; it was difficult to distinguish source from use. Most of the following can hardly be called research, but they indicate direction of interest. The few instances of research were group oriented, and are, therefore, reported in Chapter VII, "Group Procedures in Guidance and Personnel Work."

Prevocational guidance in the elementary grades was described by Boyd (7); both parents and teachers acquainted school children with various jobs through firsthand experiences. Bridges' (8) program utilized recent graduates as a source of educational information for high-school seniors planning to attend college; Forte (24) and Parker (49) used business people to provide occupational information for high-school students. DuBato (17) recommended the use at the high-school level of case conferences on occupations.

Fitzgerald (22), describing an exploratory course dealing with occupations, which was listed as part of a fine-arts program, contended that it gave students an improved understanding of their future in terms of employment. Courses in guidance for students entering high school were described and recommended by both Langhans (39) and Roche (56).

Colver (12) asserted that college placement records are valuable to students preparing for various fields. Wasserman and Mason (71), creating a

hypothetical situation with a hypothetical student trying to find a job, recorded the best procedure for him to follow. Beachley (5) described the advantages of using closed-circuit television to provide occupational information; both the professional staff and the high-school students were satisfied with having career information presented by television. A locally developed publication dealing with career opportunities was reported by Stroup (62). Diamond (15) suggested that the display files of occupational materials be located where students can see and use them advantageously. Burke (9) described how occupational information can be used "most effectively."

Methods and techniques of using occupational information in the training of counselors also received attention. Cooke (13) reported how a course can provide experience for prospective counselors in all phases of occupational information.

Summary

A persistent trend is apparent in occupational and educational information. A theoretical framework for the study and understanding of work is gradually taking form. Further refinements can easily place occupational information in more favorable light and also require understanding as great as that required in the use of tests. But research utilizing this information has not yet "got off the ground." Perhaps increased interest in theories related to career planning and vocational development may stimulate the necessary research designs.

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CHAPTER VII

Group Procedures in Guidance and Personnel Work

KENNETH B. HOYT and GILBERT D. MOORE *

OUR ABILITY to define adequately the phrase "group procedures in guidance" has not increased perceptibly in the last three years. An early definition provided by Hoppock (17), and more recently supplemented by those of Stoops and Wahlquist (35) and Froehlich (13), still leaves the impression that this phrase refers to any activities of guidance workers carried out with students in group, as opposed to individual, relationships. The lack of precision in definition has forced a rather arbitrary classification of topics in this review: (a) Multiple Counseling, (b) Occupations and Vocational Psychology, (c) Educational Planning, (d) Working with Parents, (e) Other Group Procedures, and (f) Examples of Successful Practices.

A brief description of the rationale behind this classification should serve to orient the reader to the contents of this chapter. Multiple counseling deserves special attention because of its inherent serious implication that counseling need not always be carried out in a one-to-one relationship. The two sections concerned with educational and vocational guidance represent convenient differentiations of basic guidance goals. "Working with Parents" is included as a separate topic, both because it represents a generally neglected area, and because some significant research has been completed on that topic in the last three years. "Other Group Procedures" contains examples of studies deemed important, but not fitting neatly into any of the other categories used. Examples of successful practices have been discussed separately in order to differentiate such reports from research utilizing designs of a more experimental nature.

Multiple Counseling

Multiple counseling received increased attention. Attempts to define and describe multiple counseling in operational terms were made by Driver and others (11) and Wright (39). Though both regard it as a valuable procedure, neither described its effectiveness in terms of research investigations. What of the research in this area? Five examples of controlled experiments illustrate recent attempts to assess the effectiveness of multiple counseling.

Comparing multiple counseling with an absence of counseling, Broedel (5) used the following criteria: (a) increases in school grades, (b) increases in achievement test scores, (c) increases in acceptance of self, and

* Assisted by Mary Jane Loper and Robert McIntire.

(d) reduction in incidence of stated problems. The sample consisted of 29 gifted, underachieving high-school freshmen divided at random into experimental and control groups. The experimental treatment consisted in having 16 multiple-counseling sessions with the experimental group during an eight-week period and giving no counseling to the control subjects. Initial measures were compared with measures made at the end of the experimental period for both groups and, for the experimental group, with follow-up data obtained one week later and 16 weeks later. Significant differences between experimental and control subjects were found only on the criterion of increases in acceptance of self. Significant differences were found for experimental subjects on scores on achievement tests given immediately after counseling and on those given 16 weeks later.

Caplan (6) also studied the effectiveness of multiple counseling. Seventeen experimental subjects and 17 control subjects were selected from a population of junior high-school boys exhibiting severe problems of conflict with school authorities. The experimental treatment consisted of 10 50-minute multiple-counseling sessions. In addition, individual counseling was available to both control and experimental subjects. Using a criterion of change in magnitude of correlations between self and ideal self during the experimental period, Caplan found significant increases for the experimental subjects, but no significant changes for the control subjects. Differences in increases in grade point average during the experimental period were not statistically significant. Citizenship marks, though remaining unchanged for the control subjects, increased significantly for the experimental subjects.

To assess the effectiveness of multiple, versus individual, counseling, Hewer (16) used as subjects college students enrolled in a course entitled "Choosing Your Vocation." Her criteria were the changes in certainty and realism of vocational choice and satisfaction with vocational choice. She found no significant differences during one academic quarter between 48 subjects receiving multiple counseling and 45 subjects receiving individual counseling.

Froehlich (14) also contrasted multiple counseling and individual counseling, using 42 high-school seniors as subjects, 17 of whom were individually counseled and 25 of whom received multiple counseling. By means of a criterion of increase in accuracy of self-ratings, he found that, in two of three types of statistical comparisons made, multiple counseling produced significant increases, whereas individual counseling failed to do so. The length of the experimental period was not reported.

Effectiveness of multiple counseling as contrasted with both individual counseling and an absence of counseling was studied by Marx (24). Subjects consisted of underachieving college freshmen, divided at random into individual- and multiple-counseling treatment groups. Two control groups (Group I, a random sample of underachievers who were not invited to participate, and Group II, students invited to participate but not respond-

ing) were utilized. Treatment for both the multiple- and individual-counseling groups included three sessions. No significant differences were found when either individual- or multiple-counseled subjects were contrasted with Control Group I, using increase in a semester's grade point average as criterion. Significant differences were found favoring subjects counseled individually over subjects in Control Group II and, in addition, favoring subjects counseled individually over those receiving multiple counseling.

Difficulties in reporting on the effectiveness of multiple counseling are compounded by the various meanings applied to this term. Mercer (25) reported an instance of what she called "multiple counseling," but it utilized procedures quite different from those described by Broedel, Caplan, Hewer, Froehlich, and Marx. Related to the problem of semantics is the apparent defensiveness of advocates of both individual counseling and multiple counseling. Perhaps attempts should be made to find those learnings which can best be accomplished in multiple counseling and those which depend upon counseling the individual. It seems reasonable to assume that both kinds of counseling must have some utility in guidance and personnel programs.

Occupations and Vocational Psychology

As a whole, research on courses dealing with occupations, career days, and other such guidance activities utilized the approach of the normative survey. Sinick and Hoppock (33), reviewing research during the period 1956 through 1958 relative to the teaching of occupations, listed 28 references of interest.

Roskens (28) reported an evaluation of high-school career days utilizing opinions of college freshmen who attended such events. Sixty-one percent of these college freshmen had attended a career day while in high school—an indication of continuing popularity of this device. However, 54 percent reported they had received no preparation for the career day, and 56 percent indicated it was not worthwhile. This confirms the feelings of many regarding the value of this type of activity.

Three experimental studies yielded conflicting results. Cuony and Hoppock's follow-up (8) to an earlier study (7) reported differences of increasing significance between students who took a course dealing with occupations and those who did not. This evaluation of a high-school course in "Job Finding and Job Orientation" was reported in terms of mean differences between experimental subjects, who had taken the course, and control subjects who had not. There were significant mean differences in favor of those having taken the course for each of the following criteria: (a) job satisfaction, (b) average number of weeks employed, and (c) annual earnings.

An interesting contrast to the impressive findings of Cuony and Hoppock was reported by Biersdorf (2), who utilized three groups of 24 college

students as follows: (a) a limited-treatment group that received only group interpretation of test results; (b) an extended-treatment group that participated, in addition, in group discussion of factors relative to choosing a vocation; and (c) a control group that received no attention. Using preexperiment and postexperiment measures, she assessed the following criteria: (a) change in certainty, appropriateness, and suitability of certainty of vocational choice; (b) change in degree of concern about vocational problems; and (c) change in degree of concern about nonvocational problems. Though changes in terms of each of these criteria generally favored the group that had received extended treatment, statistically significant differences were found only between this group and the control group with respect to reduction in degree of concern about vocational problems.

Kutner (20) investigated the effectiveness of field trips for high-school students, utilizing criteria of job satisfaction, earnings, length of employment, and employer ratings. Application of these ultimate criteria one year after the students' graduation revealed no significant differences between experimental and control groups. The direction of differences, however, generally favored the experimental group.

On the basis of such results it would be difficult to make a strong case for some of the current group activities dealing with occupations and based on vocational psychology. First-rate surveys might give the profession additional insights into the proper balance between group activities and counseling with individuals.

Educational Planning

Several investigations pertaining to the effectiveness of orientation activities were conducted. One of the best designed was by Williams (38), who hypothesized that a one-semester orientation course in college would significantly reduce problems; he utilized 150 first-semester college women selected at random as an experimental group and another 150 women similarly selected as control subjects. Both groups were given the *Mooney Problem Check List* at the beginning and at the close of the period. Reduction in incidence of problems among the experimental subjects was found in all areas considered, whereas slight increases were found in four areas among the control subjects. An analysis of covariance controlling initial level of problem incidence confirmed the hypothesis, showing significant differences favoring the experimental subjects.

Kobliner (19) met 35 sixth-grade pupils in 10 orientation sessions and compared them with a control group at the end of the first and second marking periods when they were in the seventh grade, applying the following criteria: (a) absence rate, (b) attitude toward school, (c) ratings by teachers of the pupils' behavior, (d) grades, (e) number of problems reported by pupils, and (f) social acceptance by peers. None of these comparisons showed experimental subjects to vary significantly from pupils

in the control group. Several of the differences, however, favored the experimental subjects in direction.

Froehlich (12) investigated the effectiveness of precounseling orientation on clients' readiness for counseling. The brief orientation period produced no significant differences between experimental (oriented) and control (nonoriented) subjects with respect to: (a) following through in requesting counseling, (b) the clients' concepts of counseling, or (c) the amount of time spent on certain topics in counseling interviews. Froehlich questioned the value of precounseling orientation for high-school students. Spivak (34) analyzed differences in the nature of problems reported by seventh- and ninth-grade pupils. His findings indicated that problems of seventh-grade pupils were much more likely to be problems of orientation than were those reported by ninth-grade pupils.

Most research in educational planning was concerned with orientation, which lends itself more readily to experimentation than other activities. Since an increasing shortage of counselors is possible, there is a need for research to distinguish educational-planning activities which can be conducted economically with groups and those which require skill in individual counseling.

Working with Parents

Three dissertations completed at New York University dealt with the effect of the utilization of group procedures with mothers on growth in reading ability of their sons. Russell (29) used group counseling; Samuels (30) used intensive group discussion; and Shatter (32) used group therapy. Each employed experimental and control subjects. Only Shatter reported that group procedure with mothers had a positive effect on their sons' gains in reading ability. Neither Russell nor Samuels found significant differences in gains in reading achievement between experimental and control pupils.

Lassar (21) investigated the effects of group discussion on the attitudes of mothers of cerebral-palsied children. This study, involving three experimental groups (14 subjects in all) and one matched control group (five subjects), used 15 discussion sessions, each lasting one and a half hours, as the experimental treatment, and made pretreatment and posttreatment personality assessments as experimental measures. Significant positive gains were reported for 11 of the 14 experimental subjects, and no measurable improvement for any of the control group.

An interesting variation on the use of group procedures with mothers was utilized by Tamminen (36), who attempted to measure changes in mothers' attitudes toward their children after they had viewed a series of televised parent-education programs. With 400 viewers as experimental subjects and 100 nonviewers as controls, the experimental treatment consisted of a series of 15-minute discussions by panels of parents

which were moderated by a child psychologist. Measures of parental attitudes toward their grade-school children before and after the series were used as the prime experimental measure. Mean scores of viewers showed a statistically significant, but not a large, increase, whereas mean scores of nonviewers remained unchanged. Tamminen proposed further exploration of the value of group viewing of televised programs.

Other Group Procedures

The variety of studies reported in this section demonstrates that many kinds of operations and research methods can be subsumed under the heading of group procedures. Undoubtedly some of the research may be more closely related to instruction than to guidance and personnel work. Clarification is needed.

Borow (3) wrote provocatively on the nature and importance of personal-development courses as group-guidance procedure. However, the effects of such courses were not investigated.

Four studies of the effects of group procedures on attitude changes in students were reported, those of Miller and Biggs (26), Grater (15), Mann and Mann (23), and Willerman (37). Miller and Biggs (26) investigated the effectiveness of free group discussion on attitudes towards racial groups when the discussion groups were sociometrically structured. Secondary-school students from one school constituted experimental and control subjects. Two experimental groups were formed; members of one group had sociographs considered high in cohesion, and members of the other, low. A control group was selected without reference to sociometric structure. An attitude scale, administered to both experimental and control groups before and after a period of free group discussion with experimental subjects constituted the experimental measure, and the discussion itself was the experimental treatment. Significant positive changes in attitudes were shown for both experimental groups, whereas attitudes of control subjects remained unchanged. No difference in changes in attitude was observed between the two experimental groups.

Grater (15) investigated the effects of free group discussion in a leadership-training course on changes in disparity between self-perception and ideal self for 30 college students elected to leadership positions. Twenty-two group-discussion sessions constituted the experimental period, and differences between pretreatment and post-treatment scores on the *Bills Inventory of Adjustment*, the experimental measure. Significant reductions were found in the discrepancy between the ideal and the perceived self, but no significant differences were observed between the ideal self and the generalized other person as defined by the *Bills Inventory of Adjustment*. Grater concluded that experiences in a group situation can make significant changes in attitudes towards self.

Mann and Mann (23) compared the effectiveness of leaderless role-playing with leaderless group discussion on various aspects of inter-

personal adjustment. Pretest measures indicated no significant differences in interpersonal adjustment among members of both groups. These same measures at the conclusion of the 12-session experimental period showed significant differences between the two groups; the results favored the leaderless role-playing group on the criteria of (a) desirability as a friend, (b) aiding in the attainment of a group goal, and (c) co-operativeness.

Willerman (37) found that, after only one discussion session with university fraternity members, significant increases occurred in acceptance of the university administration as an authority and in the belief that the university is interested in the welfare of the fraternities. No change was observed in the control group.

Studies dealing with group procedures for elementary-school children were conducted by Denny (10) and by Davis (9). Denny, studying the effectiveness of motion pictures in reducing frustration in children, found significant differences in scores on the *California Test of Personality* favoring those who received the experimental treatment, which consisted of a series of selected guidance motion pictures. Davis, also using control and experimental subjects, observed a puppet-play technique to produce significant differences in behavior reactions favoring the experimental subjects.

Those interested in applications of mental-hygiene procedures in group settings with school-age children will find a comprehensive set of descriptions and suggestions in a monograph of the American Personnel and Guidance Association (1).

This chapter has not sought to review research in group psychotherapy, but the investigations of Kaufman (18) and Sanborn (31) in this area are provocative.

Examples of Successful Practices

There remains the criterion of consumer satisfaction as a means of assessing the effectiveness of group procedures in guidance. Richards (27) reported the use of upper-class junior high-school students as conveyors of information to students in lower grades about the availability and proper use of counseling services and pointed out that following such a plan served to free the counselor for individual interviews. Brewer (4) reported that the use of multiple counseling at the junior high-school level motivated students to seek individual interviews and made them aware of their common problems.

Satisfaction with the use of group procedures with parents was reported by MacKay (22), who conducted meetings to provide parents of junior high-school students with information about the curriculum, opportunities, and activities of the senior high school.

In all of these descriptions the "Hawthorne" effect may well account for most satisfactions. It might even be profitable to study the degree of

"Hawthorne" effect which can be expected from the relationship inherent in group activities.

Summary

What new understandings have been reached in group procedures in guidance during the last three years? It is apparent that counselors are being forced to question seriously whether counseling must be carried out in a one-to-one relationship. At the same time, conditions conducive to effective multiple counseling were not demonstrated clearly enough to give the typical counselor cause to change his approach. The primary implications of research in multiple counseling seemed to be directed more toward those engaged in preparation of counselors than toward practicing counselors.

The effectiveness of group procedures in guidance in vocational development was not unanimously demonstrated. Especially interesting in this sphere were the several attempts to assess effectiveness through the use of more ultimate, rather than immediate, criteria.

The use of group procedures in guidance as aids in educational planning was investigated primarily through assessing the effectiveness of orientation procedures. Other procedures in this area received little attention.

Group procedures in working with parents through guidance programs were demonstrated to be worthy of more intensive investigation. The wide variation in topics included as "other" group procedures in guidance served to indicate still further the need for a more precise definition of the field. Group procedures in guidance directed toward personal development received almost no attention from researchers. Examples of practices deemed successful by schools employing group procedures continued to be numerous. As part of guidance and personnel services, group procedures showed themselves to be useful in some areas and promised utility in others.

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CHAPTER VIII

The Evaluation of Guidance and Personnel Services

JOHN W. M. ROTHNEY and GAIL F. FARWELL

As THE GUIDANCE movement enters into its second half century, there is general recognition of the need for evaluation of its services, but little evidence that the need is being met. Guidance services, like many others in education, are still offered largely on the bases of hope and faith. Cottle's statement (3) three years ago about the paucity of, and the great need for, cooperative and better-designed research is as apropos today as it was then.

Only three books evaluating guidance services have been published during the 50 years since such services began, and one describing an extensive follow-up appeared during the period under review. (All other reports were brief articles in which the period covered from the application of the guidance service to its evaluation was relatively short.) In that book Rothney (34) described his attempt to assess vocational, educational, and social activities of two groups at six months, two and one-half years, and five years after high school graduation. The experimental group consisted of 343 subjects who had been counseled and who were compared with 342 members of a control group who had received no special counseling while they were in senior high school. The many findings of the research were summarized in his statement that counseling did seem to assist in the accomplishment of the objectives of the American secondary school.

General discussions of the need for evaluation of guidance services appeared frequently, and some of them raised issues that should be considered by evaluators. Patterson's discussion (27) of matching versus randomization in studies of counseling merited special attention. Callis, Polmantier, and Roeber (3), in their summary of five years of research on counseling at the University of Missouri, raised some crucial questions. Coleman (6) listed 26 evaluative studies that he thought were needed. Heist (18), Hall (17), the Fifty-Eighth Yearbook of the National Society for the Study of Education, Part II (1), and Strang (37) placed evaluation studies high on their lists of researches desirable in guidance.

The Criterion Problem

Researchers were plagued with the problem of securing adequate terminal measures of attempts to provide guidance services. At times the concern went beyond the problem of how to evaluate, to a consideration of the very difficult problem of what to assess. Investigators used, as

[illegible] of counseling effectiveness such items as (a) persistence in school or post-high-school activities, (b) performance in college or other educational undertakings, (c) students' [illegible] averages, (d) evaluation by client of guidance offerings, (e) changes of goals or interests, (f) [illegible] satisfaction, (g) tendency to use public welfare assistance agencies, (h) [illegible] of earnings, (i) client's self-knowledge, (j) [illegible] of affect, (k) [illegible] about the future, and (l) specificity of choice of vocation. The use of such varied criteria may result partially from the wide assortment of assignments that counselors undertook or were delegated.

Purcell (21) studied the responses of 100 counselors to a questionnaire about functions which they attempted to perform. The clinical duties, administrative chores, and nonprofessional activities which they were assigned made it difficult for them to indicate their counseling and guidance goals, much less establish criteria for evaluative studies.

The lack of agreement about goals of counseling among those who do evaluative research was illustrated by a discussion by Goldstein and Gregg (10) about client satisfaction as a measure of counseling effectiveness. Grater (14) raised some of the issues about problems concerning criteria in his discussion of the situations in which a counselee's progress seemed to indicate a counselor's failure. Poole's study (29) revealed important differences between a counselor's judgment of the outcomes of counseling and a typescript reader's judgment of them.

Carlson and Rothney (5) found that 10 graduate students in guidance who rated responses to follow-up questionnaires by counseled and uncounseled high-school seniors could agree well with themselves on two different ratings and with other raters, when considering factual responses. There was, however, a lack of consistency by individual raters, and among the raters, in judging attitudinal responses and responses for which the subjects had given reasons, this finding suggested that, without knowledge of the background of the counselee, judging of the effectiveness of counseling on the bases of responses to questionnaires was an impossible task. Kaczkowski and Rothney (20), in an exploratory study of the use of discriminant analysis for evaluative studies of counseling, demonstrated that criteria need not be developed before evaluation is done. They recommended further trials of such procedures.

It is evident that the problem of selecting and securing adequate measures of criteria against which guidance services are to be assessed has not been solved. This conclusion can be checked by reading reviews of the following studies.

Before-and-After Studies

Investigations of guidance services in colleges, schools, and agencies took a variety of forms. A common technique appeared to be the use of a "prior look" at a sample, the application of a particular guidance

service or procedure, and then an attempt to assess the effectiveness of the procedure by a second look at the sample to determine whether expected changes materialized.

Burnett and Basham (2) described program objectives of a vocational counseling service in a Veterans Administration hospital and presented several implications for evaluation research which resulted from their investigation. Phillips (28) described a counseling service at a public assistance agency and raised questions about the effectiveness of that counseling in assisting persons to return to self-supporting roles. Although his sample was limited to two groups of 25 subjects each, he drew a generalized conclusion that, during counseling, attitudes can be developed which tend to establish an independent behavior pattern. Agencies outside educational settings have a variety of counselees and situational problems with which they must contend. A review of studies in such agencies showed only isolated attempts at evaluation. The one cited above was representative of the relatively few which appeared in print.

Some studies dealt with before-and-after analyses in terms of the applicability of specific instruments or techniques. Grigg and Goodstein (15) utilized the questionnaire method in asking clients to evaluate their counselors' performances. Several criteria were structured for evaluation, and the results indicated that clients could, and did, evaluate counselors within the limitations of the study design. The 56.6 percent return of the questionnaires leaves the reader speculating about the possible influence on the results of nonrespondents' evaluations, if their replies had been obtained.

Stern, Lewis, and Bever (36) obtained from 52 male subjects a rating of their interests prior to the administering of the *Kuder Preference Record* and prior to counseling. The study revealed that significant changes in the subjects' estimation of their interest patterns were produced by counseling, but showed that the taking of the *Kuder Preference Record* was of little value in helping the subjects make a more adequate appraisal of their interests.

Hill and Morrow (19) made a study to determine the effect of guidance services on the drop-out rate in schools. They obtained ratings of the guidance services of 19 schools by a jury of guidance specialists. The investigators then attempted to determine the relationship between a drop-out index and the rated adequacy of the schools' guidance services. A small but consistent relationship between the two variables was found. Additional comparisons revealed no difference between the drop-out index and teachers' educational preparation, teacher-pupil ratio, teacher turnover, or number of transported pupils. It was concluded that the rated quality of the guidance services and quality of curricular offerings were more closely related to a low drop-out rate than the other variables.

Patterson's study (26) of counseled and noncounseled individuals in an industrial school revealed no significant differences between the groups

when criteria of persistence in attendance and grades were employed. He suggested that the factor of motivation needed further investigation.

Another approach to evaluation after counseling was presented by Weeks (41), who studied internal factors of counseling interviews in a sample of high-school boys. He found that the level of affect was significantly related to the proportion of the talking done by the client in each analysis unit. The counselor's style and level of affect were not significantly related.

Studies dealing with personnel services at the college level were more numerous than those at other educational levels. This situation raised the following questions: (a) Are studies in guidance and counseling more plentiful at this level because research is given more positive support? (b) Is research at this level needed more than research at the elementary- and secondary-school levels? (c) Is it possible that counselor-educators do not emphasize research to the degree that school counselors see this as an important aspect of their work? (d) Can university researchers get their materials published more readily than guidance workers employed in elementary- and secondary-school settings?

Even though there are more evaluative studies at the college level than at the elementary- and secondary-school levels, differences in the quality of the research were not always significant. Nevertheless, there were interesting exploratory studies. For example, Robertson (33) reported on a precollege testing and counseling program conducted at the University of Mississippi. One hundred and eighty-six students participated in the three-day program. Robertson found that 25 percent of the students changed their goals, 47 percent changed their choice of highest interest, 30 percent changed with respect to their understanding of their highest and lowest aptitudes, and 43 percent changed their estimates of the vocational scene. A follow-up two years later revealed little stability in the subjects' self-estimates.

Farwell (12), in a study of a counseling-admissions procedure for borderline applicants for admission at Michigan State University, reported that staff counselors of the university, who utilized an intensive counseling procedure, were able to identify those who might be successful in college with greater certainty than the high-school officials who had recommended admission and predicted likelihood of success. The criteria were obtained from a one-year follow-up of those admitted through the counseling-admissions procedure.

King and Matteson (22) received a 48.8 percent return to a questionnaire dealing with students' perceptions of a university counseling center. They found that students brought the gamut of human problems to the center. Females brought educational problems more than males; freshmen and sophomores brought more educational problems than did juniors and seniors. Generally, these Michigan State students brought educational-vocational or social-personal problems, but not both types of problems, to the center.

Gustad and Tuma (16) were not able to discover any significant differential effects on the learning of counselees when different procedures of testing and interpreting were employed. They felt that the results of their study should cause guidance workers to question seriously some of the widely accepted ideas and opinions about the relationship of success of counseling to specific techniques. Robertson (32) checked similarities and differences between counselors and clients in evaluating counseling interviews. He found agreement on the reasons for seeking counseling, the benefits obtained, and decisions regarding educational and vocational plans, but found less agreement on the reasons for benefits obtained and influence of a testing program on plans.

Tuma and Gustad's small sample of 58 cases limited their findings in a study of the influence of clients' and counselors' personalities on clients' learning (40). They concluded that counselors who utilized essentially the same methods with similar clients produced different effects on their clients' performances in learning about themselves. They also noted that close resemblance between clients and counselors on personality variables was associated with the achievement of relatively better self-understanding by the client. By a questionnaire, Porter (30) studied a systematic selection of clients counseled by 50 different counselors over a four-year span. One hundred and two of 190 responses solicited were usable. The responding clients were satisfied with the counseling they had received. So many variable influences were reported, however, that many questions must be raised about the efficacy of the procedure employed. The greatest gain appeared to be that of providing a structure for future evaluative attempts.

The studies reported here are representative. The lack of long-term studies, the use of limited samples, the inadequacy of procedures and techniques, and the failure to obtain adequate criteria suggest that there is much to be done in the sphere of before-and-after experimentation. The investigators are to be commended for their pioneering efforts. They have shown clearly, however, that their methods, procedures, and designs have not yet produced evidence of the effectiveness of guidance services to the extent that guidance personnel can be complacent or satisfied.

Control-Group Studies

Relatively few researchers in guidance and personnel have employed the control-group method. Among the exceptions, Scarborough and Wright (35) used control and experimental groups in a study designed to test the effectiveness of a precollege educational guidance clinic. They found no statistically significant differences in grade point averages and persistence until graduation between those who did, and those who did not, attend the clinic. Merenda and Rothney (25) developed experimental evaluation scales in an attempt to evaluate the effects of an intensive counseling program eight years after the beginning of counseling and five years after

its termination. The data tended to reveal a more desirable pattern of adult behavior and attitudes for the experimental group than for the control group in terms of the criteria designed to measure such outcomes.

Caravello (4) used control-group procedures to compare the effects of counseling by teacher-counselors to those of counseling by an itinerant guidance specialist. He reported a more positive evaluation for the guidance specialist than for the teacher-counselor. Many of the authors of studies listed as titles in summaries of theses and dissertations by Cottle, Callis, and Polmantier (9), Cottle, Hummel, and Muthard (10), and Cottle (7) employed control-group methods.

During the last three years, attempts to evaluate group procedures in guidance services continued. Some of them are reported in Chapter VII, "Group Procedures in Guidance and Personnel Work."

Miscellaneous Studies

In any categorization of research, a few studies which attempt to assess some aspect of the education of counselors or the effects of guidance services are always difficult to classify. An example is McCully's description (24) of developments in counseling in the Veterans Administration since 1943. He concluded that the program had helped to create positive attitudes among adults toward counseling as a legitimate and valuable function. Thomas and Mayo (38) studied the effectiveness of counseling with Marine recruits; after a second evaluation it was concluded that the training procedure employed was effective in improving counselors' predictions of recruits' performances.

Kirk (23) analyzed the effectiveness of inservice preparation of counselors. She was not satisfied with the three instruments developed to assess the program and indicated need for further investigation. Thrush (39) undertook a case study of a counseling center to determine the forces and dynamics at work. Counselors classified counseling problems by Q-sort procedures and repeated the procedures four years later. The principal finding was that there had been a major philosophical shift on the part of the counselors from an emphasis on vocational counseling to an emphasis on counseling for personal adjustment.

Kiell (21) utilized client-satisfaction checklists to evaluate the counseling procedures of the faculty at Brooklyn College. He found that students were not aware of, or familiar with, counseling procedures. They were generally favorable toward the services but indicated areas in which improvement was needed. Estrin (11) reported an evaluation of professional career speakers on the basis of responses to questionnaires sent to 60 schools in which the speakers had appeared. The report was not definitive, but the author concluded that the program sponsored by the New Jersey Engineers Committee for Student Guidance warranted continuation.

Summary

It was apparent that some progress in evaluation of guidance services was made during the period under review. Neither quality nor quantity of research studies warrants a high degree of optimism about the evaluation of guidance and personnel services. The pioneering efforts so far achieved have indicated that the problems of securing adequate criteria, amassing longitudinal data, and devising suitable research designs have not yet been solved. There is, however, evidence that professional guidance workers are becoming more aware of the need for solving them.

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Index to Volume XXX, No. 2

Page citations are made to single pages; these are often the beginning of a chapter, section, or running discussion dealing with the topic.

ACE Psychological Examination: Q-L differential and emotional problems, 142; and choice of college major in science, 143

Achievement-motive measure: use with Korean veterans, 151

Administration: of guidance services, 105

Admissions procedure: and counseling, effect of, 171

Affect, level of: relation to client participation, 171

Agriculture: factors influencing choice of, 152

Allport-Vernon Study of Values: use with guidance workers, 118

Anxiety level: and competence of psychotherapists, 118

Appraisal data: use of, by guidance and personnel workers, 141

Articulation: of educational levels, 102

Attitude changes: effects of group procedures on, 163

Attitudes, moral: in counseling, 99

Blind college students: vocational objectives of, 153

California Test of Personality: use as criterion measure, 164; and socioeconomic status, 144

Career days: research on, 160; programs, evaluation of, 173

Cerebral-palsied children: effect of group discussion on mothers of, 162

Client: learning, personality influence on, 172; satisfaction, as criterion for evaluating counseling, 133, 173; self-learning, effect of personality on, 136

Client-centered therapy: current accounting of, 134; and the therapeutic relationship, 99

Closed-circuit television: use to disseminate occupational information, 154

College achievement: predictors of, 144

College orientation program: effectiveness of, 161

College personnel services: studies of, 171

Control-group method: use in evaluation of guidance programs, 172

Counselee: expectations of counseling, 133; evaluations of process, 133

Counseling: client choice of client-centered vs. eclectic, 133; counselor-client evaluation of, 172; definition of field, 131; effectiveness, client satisfaction as a measure of, 169; individual vs. multiple, 159; judging effectiveness of, 169; theory, 132; value orientation in, 136

Counseling center: case study of, 173; student perceptions of, 171

Counseling orientation: classification of, 135; instrument to measure, 135; relation to specific techniques, 172

Counseling outcome: to personality structure of counselee, 134

Counseling process: determinants of, 132

Counseling profession: status of, 123

Counseling program: evaluation scales for, 172

Counselor: certification of school, 125; desirable qualifications of, 116; duties and responsibilities of, 108; effects of personality on counseling outcomes, 134; effectiveness, evaluation of, 118; job analysis of, 135, 169; perception of role, 109; salary of school, 125; selection techniques for, 119; subroles, analysis of, 117; supply and demand, 124; training of, 120

Counselor institutes: evaluation of, 122

Counselor training programs: rejection ratio, 116; inservice, effectiveness of, 173

Criteria: of counseling effectiveness, 169

Critical-incident technique: use in counselor training evaluation, 122; use to differentiate effective and ineffective counselors, 135

Culture: impact of, on counseling, 132

Cumulative records: status and extent of, 108

Descriptive cases: effects of counseling upon, 159

Differential Aptitude Tests: and prediction of achievement, 144; and counselor effectiveness, 118

Discriminant functions analysis: for evaluative studies of counseling, 169

Drop-out rate: effect of guidance services on, 170
Drop-outs: prediction of high-school, among females, 144

Economic subsidies: effect of, on supply of counselors, 125
Edwards Personal Preference Schedule: independence of subscores, 144; use with rehabilitation counselor trainees, 117
Elementary school: group counseling procedures for, 164; guidance services, 107
Emotionally disturbed: and counseling, 132; interests and occupational choices of, 143; theories of vocational choices of, 149
Empathy: relation to aesthetic sensitivity, 135
Employee attitudes: research on, 148
Empirical viewpoint: as applied to guidance, 98
Ethics, professional: of the counselor, 125
Evaluation: of guidance and personnel services, 168; of training for guidance and personnel workers, 121

Field trips: effectiveness of, in occupational choice, 161
Fraternity: acceptance of university administration after group discussion, 164

General Aptitude Test Battery: and counselor effectiveness, 118
General Educational Development Test: analysis of, 144; comparison of, with other mental ability tests, 144
Graduate programs: in guidance and personnel work, 119
Group procedures: use of, in guidance work, 158
Group psychotherapy: in counselor education, 119; research in, 164
Guidance: definition of, 102; differentiated from counseling, 131; in elementary grades, 153; philosophical foundations of, 97; relationship to education, 101; role of classroom teacher in, 110; theoretical framework of, 100, 132
Guidance and personnel services: evaluation of, 168; studies of college, 171
Guidance directors: functions of, 106
Guidance office: relation to administrative office, 108
Guidance workers: duties of, 117; sources of, 116; supply and demand, 124

Heredity and environment: influence on vocational choice, 148

Inservice counselor training: evaluation of, 122, 173
Interest inventories: educational, 119; employment in prediction studies, 143
Interests: stability of, with knowledge of aptitude, 142
Interviews, group: as instrument in selection of counselors, 119
Inventory of Adjustment and Values: as criterion of effect of group discussion, 163

Job satisfaction: research on, 148
Junior high-school orientation program: effectiveness of, 161

Kerr-Speroff Empathy Test: use with rehabilitation counselor trainees, 117
Kuder Preference Record: effect on self-evaluation of interests, 170; interpretation of, 142; use with guidance workers, 118; use to predict success in vocational school, 143; use on college science majors, 143

Leaderless role-playing: effectiveness of, compared with leaderless group discussion, 163
Leadership-training course: effects of free group discussion in, 163
Limits: place of, in counseling, 132
Longitudinal study: evaluation of guidance services, 168

Matching: versus randomization in studies of counseling, 168
Mental-hygiene procedures: in group settings with school-age children, 164
Miller Analogies Test: and counselor effectiveness, 118; use with rehabilitation counselor trainees, 117
Minnesota Multiphasic Personality Inventory: comparison of scores of college students and parents, 143; and counselor effectiveness, 118; scores of delinquent vs. nondelinquent boys, 144; use with rehabilitation counselor trainees, 117
Mooney Problem Check List: as criterion of effectiveness of college orientation course, 161

Mothers: effect of television on attitudes toward children, 162; effect on sons' reading growth, 162
Motion pictures: effectiveness of, in reducing frustration, 164
Multiple counseling: research on, 158
Multivariate analysis: use to study counselee-counselor interaction, 136

National Defense Education Act: and guidance services, 105; recognition of counselor education, 123
Negro employment: changes in, 153
Negro college women: occupational choices of, 151

Occupational aspirations: determinants of, 150
Occupational classification: research on, 149
Occupational course: description of, 153; research on, 160
Occupational information: research on, 148, sources of, 152; materials, uses of, 153
Occupational mobility: of persons of different racial extraction, 149
Occupational roles: of women, 151
Occupations: social status of, 150
Organization: of guidance services, 105
Orientation activities: effectiveness of college, 161

Parents: group procedures with, 162, 164
Personal-development courses: use of group guidance in, 163
Personality: relationship of, to scholastic aptitude, 142
Personality pattern: of effective counselor, 117
Personality tests: status of research on, 143
Phenomenological theory: and the therapeutic relationship, 99
Philosophy: of guidance, 97
Placement records: value of, 153
Practicum training: use in guidance and personnel training, 120
Precollege guidance clinic: effectiveness of, 172
Precollege testing and counseling program: evaluation of, 171
Precounseling orientation: effectiveness of, on client readiness, 162
Preparation: of guidance workers, 115
Professionalization: of guidance and personnel workers, 115, 123
Psychology of occupations: research on, 148
Pupil problems: effect of teacher knowledge on, 111
Puppet-play technique: use to reduce frustration in children, 164

Racial groups: effectiveness of group discussion on attitudes toward, 163
Referral resources: counselor acquaintance with and utilization of, 108
Rehabilitation counselors: training of, 121
Religious orientation: relation to counseling, 99
Role expectations: of counselors, 117
Role perceptions: of school administrators, 148; of school counselor by others, 109
Role-playing, leaderless: compared with leaderless group discussion, 164

Scholastic aptitude: and personality, 142
School counselors: certification of, 125; salary of, 125
Selection: of guidance workers, 115
Self-acceptance: change in underachievers with counseling, 159
Self-appraisal: course for prospective guidance workers, 119
Self-concept: and vocational choice, 100
Self-discipline: as a part of adjustment, 101
Self-knowledge: increased by counseling, 134
Self-perception: discrepancy with ideal self, effect of group discussion upon, 163
Self-ratings: increase in accuracy of, with counseling, 159; stability of, 171
Social status of occupations: relation to income, 150
Socioeconomic status: and academic aptitude, 144; and *California Test of Personality*, 144; relation to interest-inventory scores, 143; relation to occupation, 150
Sociology: of occupations, 149
Sociometrically structured groups: attitude change in, 163
Strong Vocational Interest Blank: stability of profiles, 143; use with rehabilitation counselor trainees, 117
Student handbook: characteristics of, 111

Talent: identification of, 141
Teacher as guidance worker, 110
Teacher-counselors: comparison with guidance specialists, 121; effects of, 173
Television: use to change mothers' attitudes toward their children, 162
Test data: use and interpretation of, 141; methods to assist interpretation of, 111
Test selection: comparison of various methods of, 142
Tests: use of, for selection of counselor-trainees, 116
Tolerance for ambiguity: relation to counselor's effectiveness in communication, 118, 135
Training: of counselors, 120; of guidance workers, 115; evaluation of, for guidance and personnel workers, 121

Underachievers: effect of counseling upon, 159; effect of individual- and multiple-counseling upon, 159

Values: role of, in counseling, 99, 136
Vocational-agriculture teachers: guidance work of, 121
Vocational choice: research on, 151; suitability of, resulting from different counseling treatments, 161
Vocational counseling: shift from, 173
Vocational development: theory of, 100, 148
Vocationally handicapped: and counseling, 132

Wages of a lifetime: relation to length of time in school, 153
Women: occupational roles of, 151

REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association. Contents are listed in the Education Index.

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Volume XXX, No. 3 **June 1960**

Curriculum Planning and Development

Reviews the literature for the three-year period since the issuance of Vol. XXVII, No. 3, June 1957.

TABLE OF CONTENTS

Chapter *Page*

Introduction 184

I. Curriculum: The State of the Field 185
JOHN I. GOODLAD, *University of Chicago, Chicago, Illinois*

II. Forces Influencing Curriculum 199
ALICE BRESLOW, *San Francisco State College, San Francisco, California*
JEROME DISQUE, *San Francisco State College, San Francisco, California*
GUNNAR SAUSJORD, *San Francisco State College, San Francisco, California*
ROBERT SMITH, *San Francisco State College, San Francisco, California*
STANLEY SOLES, *San Francisco State College, San Francisco, California*
FRED WILHELMS, *San Francisco State College, San Francisco, California*
METTA ZAHORSKY, *San Francisco State College, San Francisco, California*

III. Components of the Curriculum 226
OLE SAND, *Wayne State University, Detroit, Michigan*
DON DAVIS, *Wayne State University, Detroit, Michigan*
ROSE LAMMEL, *Wayne State University, Detroit, Michigan*
THOMAS STONE, *Wayne State University, Detroit, Michigan*

IV. Teaching 246
ARNO A. BELLACK, *Teachers College, Columbia University, New York, New York*
DWAYNE HUEBNER, *Teachers College, Columbia University, New York, New York*

Page

V. Administrative Structure and Processes in Curriculum Development 258

VIRGIL E. HERRICK, *University of Wisconsin, Madison, Wisconsin*

Index 275

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INTRODUCTION

THIS issue of the REVIEW reports research and selected speculative, theoretical, and analytical papers pertaining to curriculum which have appeared since the June 1957 issue (Volume XXVII, No. 3) entitled "Curriculum Planning and Development." A few references are to prior publications, for comparative purposes and because some studies cited here depend on previous research or theoretical formulations.

Major problems encountered were similar to those which have confronted previous Committees. It is difficult to separate curriculum practice and curriculum as a field of study from education as a whole. It is both difficult to isolate curriculum studies and misleading to define the field by reporting research when curriculum as yet is so little guided by research. The Committee made an earnest effort, therefore, to organize its efforts around a framework that might be useful for both viewing the field and conducting research in the future.

What constitutes curriculum and how the definition determined organization of this issue is discussed in the first section of Chapter I. The design of the issue will thus be best understood by reading it consecutively.

JOHN I. GOODLAD, *Chairman*
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CHAPTER I

Curriculum: The State of the Field

JOHN I. GOODLAD *

Scope of the Curriculum Field

REVIEW OF research on curriculum planning and development first necessitates agreement on what concepts, data, and processes are involved in an inquiry in the field of curriculum. The reader will not, however, discover a single explicit definition of curriculum in this issue of the REVIEW. Prevailing definitions approximate those summarized in the June 1957 issue (3): (a) The curriculum is a design or plan of institutionalized education. (b) The curriculum consists of the actual learning opportunities provided at a given time and place. (c) The curriculum is an instrument for bringing about psychological changes in learners as a result of their activities in an educational institution. Though the second definition is more commonly stated as ". . . all the educational experiences that a learner has under the guidance of the school" (24), the term "learning opportunities" is substituted here for the term "educational experiences"; since an "experience" usually is defined as the result of an interactive process, such substitution is necessary if the distinction between definitions (b) and (c) is to be a real one.

Distinctions among these and other definitions of curriculum appear not to affect significantly the kinds of questions and problems dealt with in common by those who work in the field of curriculum. As Kearney and Cook (24) point out, even those who define curriculum as "something that happens to learners" devote their attention to problems involved in developing a curriculum plan or design.

The following statements have been agreed upon by the Committee responsible for preparing this issue of the REVIEW OF EDUCATIONAL RESEARCH and have been used in reviewing the literature and summarizing findings:

1. Curriculum planning takes place in a social context and involves translating views of the nature of man and the universe into educational aims. Actual conditions—war and peace, work and leisure, wealth and poverty, education and "miseducation"—influence curriculum decision-making. Knowledge about learning and the educative process must be taken into account. Governmental, professional, and lay forces mold educational policy. The social context includes highly complex political structures through which pertinent data may, or may not, be applied in arriving at curriculum decisions (Chapter II).

* With the assistance of Margaret P. Ammons, the University of Chicago

2. The field poses unique questions to be answered for all types of education. Ends must be determined, and means to these ends must be considered; methods of organization and evaluation must be developed. Answers to these questions—and the lack of answers—determine the character of a curriculum (Chapter III).

3. Teachers' decisions reflect their interpretations of all curriculum decisions made up to the point at which teachers and learners engage in the learning-teaching process. Their decisions involve dealing constructively with realities within the classroom and with a variety of factors and forces from outside the classroom, and these decisions are heavily weighted by their own values. Learners react to various stimuli according to their perceptions of these stimuli (Chapter IV).

4. Curriculum development is implemented through administrative, supervisory, and organizational arrangements. Responsibility is delegated to professional people to create a setting for curriculum development and improvement. The function of these people is to provide leadership, to see to it that certain facilities and materials are available, and to create a framework within which instruction proceeds (Chapter V).

This first chapter deals with many of the same questions, but in different ways. It emphasizes curriculum as a field of inquiry and attempts a classification of problems and questions according to nearness to, or remoteness from, acts involved in the learning-teaching process. At the societal level are various analyses, pronouncements, and reports, conceived broadly, or concerned with some type of education—general, vocational, and professional; elementary, secondary, higher, or adult. At the institutional and instructional levels are proposals and programs pertaining to specific, identifiable institutions or groups of learners, and to the actual performance of teachers.

This chapter draws primarily upon analytical and theoretical formulations, using selected research studies only to illustrate kinds of studies and data that can be pertinent. (What one chooses to call data depends upon the theory one constructs to explain phenomena.) Questions are raised in each section which may prove useful in the guidance of future research—questions about who should make what decisions, about appropriate sources of data for decision-making, and about how curriculum decisions are made.

The Societal Level and Curriculum Decision-Making

In all periods in history there have been practical and theoretical proposals for educational reform. It is virtually impossible either to identify the impact of long-standing philosophical formulations during any brief period, or to single out and predict the impact of fresh statements appearing during such a period. For example, how much and in what ways did John

Dewey influence curriculum during the period under review? The John Dewey centennial was celebrated in 1959 with a rash of publications concerning the philosopher and his work (for example, 5, 9, 38). Are curriculums anywhere being redesigned to correct what Snow (44) referred to as a long-standing and widening schism between two intellectual cultures, the literary-artistic and the scientific? He argued that, in today's world, standards of scientific literacy must be placed in importance side by side with standards of the traditional "literary" culture.

The last three years concluded a decade of unusual interest in, and debate over, education in the United States. Evaluations of U. S. education in the literature between 1956 and 1958 became more negative toward the end of this period (29), apparently as a result of the launching of the first Soviet satellite. Whyte (49) asserted that the school must become what Riesman (36) terms "counter-cyclical," throwing its weight against powerful socializing forces that shape "the organization man." With Commager (7), he maintained that the socialization of individuals is now being effected by other institutions and forces, and that the schools must place more emphasis on contributing significantly to the individual's intellectual development. Rickover (34) tilted at world affairs, economic resources, national crises, comparative education, philosophy, psychology, community organization, teacher qualifications and certification, and curriculum and instruction in formulating a bill of particulars for U. S. schools. Conant (8) endorsed the comprehensive high school that Rickover condemned.

It requires some stretching of both language and imagination to classify such material as curriculum research. The several authors do not hold positions in federal or state political structures concerned with, or directly controlling, public education, nor are they in positions involving responsibility for planning specific curriculums. Nonetheless, there is often a parallel between influential lay opinion of what curriculum ought to be and what happens within educational institutions. For example, within months after release of Conant's report, high schools in various parts of the country announced new graduation requirements closely coinciding with his recommendations. Rickover considered Dewey's influence so far from dead that he found it necessary to condemn him repeatedly; Derthick, justifying his 1961 budget request before the House Committee on Appropriations (32), was called upon to defend the U. S. educational system against the charges earlier delivered by Rickover before the same Committee. Rickover's appearance on NBC's "Meet the Press" brought the largest audience response in the 14-year history of the program, almost unanimously praising Rickover (32). It would be interesting to know what curriculum changes, if any, have taken place in the schools of Park Forest, Illinois, which Whyte singled out as providing an example of what schools ought not do; and how much Stoddard (45) was influenced—even indirectly—by Snow's lecture in formulating part of the theory underlying certain curricular and organizational innovations in selected elementary

schools involved in a project with New York University where Stoddard is dean, the resemblance in their theoretical base is striking.

Certainly, people with direct responsibility for education mold curriculums according to some conception of what education ought to be. In many countries—and particularly in the developing countries of Africa, Asia, and South America—political and educational leaders view education as essential to the advancement of whole peoples. In an awe inspiring revolution of the human spirit illiterate parents see schooling as essential to the future welfare of their offspring, educational effort is focused upon the establishment of primary schools and upon keeping pupils in them long enough to become functionally literate (48). In the United States, with total literacy close to an established fact, but with national and individual survival thought to be heavily dependent upon science and technology, there is increasing emphasis upon science and mathematics (48).

The fact that curriculum decisions should, and inevitably do, reflect some human conception of what ought to be—frequently somebody's perception of someone else's conception of what ought to be—raises profound questions for curriculum theorists and researchers, answers to which have far reaching implications for all citizens. Each question must be examined with a view to determining methods and sources of data appropriate to its solution. The question, for example, of who should determine the purposes and content of the educational program in the United States involves moral and legal issues, as Smith, Stanley, and Shores (43) so well point out. Questions of how to determine the best educational ends, of what they are, and of how to implement them, quickly acquire philosophical, political, strategic, and psychological considerations. Woodring (51) looked to the great philosopher (not necessarily the professional) to enunciate core values of the American people so clearly that the tasks of the school would become clear. He had little to say about procedures through which such values might be translated into educational programs. Lieberman (25), on the contrary, brushed aside philosophical issues and focused on the political machinery through which a powerful teaching profession might exert effective pressure in educational decision-making, presumably to achieve improved educational practices.

It is astonishing that curriculum research has dealt so sparingly with the questions of what is expected of educational institutions and how curriculum decisions are made. It is said over and over that the schools belong to "the people" and that "the people" determine the objectives of their schools. What do "the people" want? Downey (11), Seager (39), and Slagle (41) built a conceptual model of mutually exclusive unit-functions to define the tasks of elementary and secondary education. From this model, they derived an instrument for assaying the perceptions of educational objectives held by various sub-publics. They sampled 1286 past and present educators and 2544 noneducators in 15 communities—a residential suburb, an industrial center, and a rural center in each of five regions, the West, the Midwest, the East, the South, and Canada. Downey's

studs identified the three R's—"the skills for acquiring and communicating knowledge"—and cultivation of a "love for knowledge" to be the first and second priorities for both elementary and secondary education among all these sub-publics in all regions. Seager and Slagle found that these two priorities persisted when the educator group was separated from the non-educator group, and when occupation and age sub-publics were compared. Interesting variations from group to group and on the basis of differing levels of education were noted on items farther down the scale of priorities. Slagle found occupational classification to be more productive than income, age, or sex grouping in indicating differences of opinion regarding the task of the school.

To what extent do the people want what Commager, Conant, Dewey, Rickover, or some other "success figure" wants? Does the people's perception of what Conant and Rickover want coincide with what these men really want? Where and in what way should and do professional educators, subject specialists, foundations, and other groups enter into the decision-making process at the societal level?

To what extent and in what ways is the kind of education the people want actually implemented in curriculum decision-making? And, back to the question of authority and responsibility raised earlier, to what extent and in what ways *ought* the people's want to be implemented?

Empirical research won't answer the "ought" questions. But, until "ought" questions are separated from "what" questions and cast into conceptual constructs from which explanatory hypotheses can be derived and tested, the kind of research needed to explain curricular phenomena and to guide the curriculum worker in his inevitable decisions of "how" and "when" will not be forthcoming.

Institutional-Instructional Levels and Curriculum Decision-Making

As Chapter IV is devoted to curriculum planning and development at the instructional level, this section deals primarily with decisions and decision-making processes involved in planning and developing curriculums for various types of institutions.

Curriculum decision-making at the institutional level pertains to a specific educational institution or group of institutions having identifiable students, teachers, patrons, service areas, and sanctioning bodies. There appears to be considerable agreement among curriculum theorists regarding the major tasks of curriculum planning and development encountered at this level (17, 43, 47): determination of objectives; identification of the kinds and range of learning opportunities pertinent to these objectives; selection of designs or patterns through which these opportunities may be most effectively provided; and development of procedures for evaluating, changing, and improving the curriculum.

Educational proposals and decisions at the societal level become one of several sources of data to be considered in decision-making at the institutional level. As Lieberman (25) pointed out, however, it is naive to believe that local school boards actually control all the decisions—about the curriculums and about other matters—pertaining to their schools. Campbell (6) termed this belief "folklore," citing state and federal supreme court decisions to document his statement that the public schools have always operated within the framework established by the states and that federal influences have always been prevalent. He went on to observe: "Actually, current realities may be more in keeping with what our public policy for education ought to be than the prevailing fantasy is."

The question of who should make what decisions is as complex at the institutional as at the societal level. Hanna's (21) proposal for a national curriculum stirred much debate. Key questions regarding such a proposal are: "What curricular questions at what levels of generality and specificity can best be answered at the national level?" and "How are the answers to be used as data-sources for decisions appropriately left to the local level?" Conant (8) pointed to the uselessness of only one year of foreign language in high school; nonetheless, uninformed local decisions frequently condone such practice.

How institutional curriculum decisions are influenced and made is a provocative question for research. Certainly, the official pronouncements of boards of education or trustees responsible for specific institutions constitute inescapable sources of data for the professional. What views do board members hold? What views of what groups shape the decision-making processes of individual board members? Is there a relationship between values and/or educational viewpoint of certain groups and curricular practices at a given time in a given place? McPhee's (28) study of the relationship between individual values, educational viewpoint, and local school approval provided a basis for needed research. If the phrase "identifiable curriculum practice" is substituted for "local school approval," it becomes apparent that McPhee's model can throw light on the kinds of questions raised. Preliminary research into community power structure as it affects local school policy would give some needed indications of the most productive groups to sample.

In one sense, a rational set of goals for an educational institution would be those agreed upon by the sanctioning body (community), faithfully transmitted through the agency of that body (board) to the professional leader (superintendent), and accurately translated by the professional group (teachers) into specific educational objectives. The superintendent (or other top-level executive) is a cultural hybrid linking confused and confusing cultural expectations from without and professional decision-making processes within.* Hencley's (22) study, however, causes one

* For clarification of this concept, the writer is indebted to Alicja Iwanska, "The Role of the Curriculum Maker in Cross-Cultural Perspective" (unpublished paper).

seriously to question the rationality in the process at the vital point of this link. He examined congruence in perceptions and expectations held by school superintendents and their major reference groups with regard to the superintendent's role. The sample consisted of superintendents, members of the boards of education, and selected teachers, principals, and members of the PTA councils in 15 cities of Indiana, Illinois, and Wisconsin. Hencley found conflict between the superintendents' beliefs regarding their role and their perceptions of the expectations of these other reference groups regarding their role. Superintendents' perceptions of the beliefs of others and the actual beliefs of others also conflicted, but the actual beliefs of superintendents and of the several reference groups did not significantly differ. His data suggest that superintendents experience significant difficulty in assessing accurately the true expectations of others. The effectiveness of superintendents as interpreters of what various groups want for their schools must be questioned. Curriculum literature, emphasizing rational, intellectual processes of transmitting societal concerns into institutional curriculums, largely ignores certain operational facts of life.

The professional educator seeks to make formulations of educational objectives useful, whatever their derivations may be. The authors of Chapter III state that educational objectives, to be of maximum usefulness, should indicate both the kinds of behavior desired in the learner and the range of content or subject matter to be dealt with. They identify a present trend toward emphasis on defining content, citing a series of large-scale demonstration projects in mathematics, languages, and the physical and biological sciences that are now influencing the secondary-school curriculum. Such a trend, if not carried too far, might balance the trend, which has been developing slowly over the last 40 years, toward emphasis on the behavioral aspect of education (17, 47). Interest in the behavioral considerations recently found expression through a taxonomical analysis by a group of college examiners (4). A study at the secondary-school level (13) supplemented an earlier study at the elementary-school level (23); both emphasized learner behavior. All three studies are being used to guide test preparation and evaluation procedures.

Discussion of educational objectives up to this point has implied emphasis on teacher clarification of desired learner behavior. Such an emphasis could readily lead to the conclusion that appropriate teacher behavior is best derived from improved insight into learning and, subsequently, into how learning is best induced. Smith and others (42), while not denying the possibility of deriving a theory of teaching from a theory of learning, were not impressed by past progress toward this end. Teaching is one thing and learning quite another, they maintained. Smith and his research team, exploring the logic of teaching as exhibited in classroom discourse (2), broke such discourse into pedagogically significant units, which they then classified as logical operations. Their conclusion: there are logical operations in teaching, some more prevalent than others, notably

those of describing, designating, and explaining, in that order. Smith and his colleagues further noted a variation in frequency of these logical operations with a variation of subject matter.

As is so often the case with new and promising approaches, the surprising simplicity and straightforwardness of Smith's approach cause one to wonder why it was not exploited long ago. Smith would be first to admit that it is incomplete, his other writings make this point clear. Nonetheless his findings have high level potential significance as guides to the selection of procedures to assist teachers to perform according to the demands of certain kinds of teaching.

For several decades, teacher groups have engaged in formulating comprehensive sets of educational objectives. Nerbovig's (30) study revealed that elementary school teachers, especially those with considerable teaching and curriculum-planning experience, use objectives to relate their planning, selection of learning opportunities, and evaluation of pupil progress to educational objectives. However, there appear to be no studies establishing an actual relationship between increased clarification of educational objectives and improved discrimination in the selection of classroom learning opportunities for students. In the realm of evaluation, Bloom and his associates (4) found little teacher appraisal of cognitive behavior above the level of mere possession of information, even when stated objectives called for more profound levels of cognition.

One of the reasons why a relationship between teachers' clarification of objectives and specific classroom practices has not been established may be that both aspects of curriculum planning have been global. Wood's (50) attempt to classify objectives for teacher education from an analysis of catalogs from 239 institutions of higher learning revealed part of the problem: For the most part, the statements of objectives were too general or broad to be classified by any taxonomical scheme. Provus (33) illuminated another part of the problem: Educators are likely to see only one type of behavior in an educational objective when, in reality, two or more may be involved. He investigated social problem-solving behavior, identifying two affective behaviors in what at first appears to be a strictly cognitive process. He did not identify any significant relationship between these affective behaviors and intelligence as measured by IQ. Failure to recognize the presence of these behaviors in an otherwise cognitive objective could well result in failure of teachers to provide instructionally for a significant part of the behavioral change sought. Further analysis of the structure of educational objectives is needed, together with analyses of the kinds of teaching and learning processes necessary to attainment of all parts of a single objective.

It is a popular belief in some educational circles that involvement of teachers in curriculum planning leads to increased satisfaction on the part of teachers and increased learning by students. McGuire (26), however, was unable to obtain evidence in support of the following proposition: The participation of teachers in co-operative programs of curriculum planning

results, other things being equal, in significantly greater improvement in student achievement than that which occurs when the curriculum is planned either by administrative personnel alone or by teachers working individually. Smucker (40) formulated a model separating research (of an action type) from nonresearch methods, and consensus group processes from processes based on dependency on status leaders in curriculum planning. He was unable to establish a significant relationship between method or process used and satisfaction of teachers with curriculum study programs. Nonetheless, the teachers scored the consensus-research combination highest as their ideal model for curriculum study. Apparently, however, they were dissatisfied with the relative amounts of consensus-research experienced in the projects. Much remains to be learned about *what* should be planned by teachers in improving curriculum practices, and *how*.

No new curriculum designs were forthcoming. It is yet too early to determine whether the two-track plan devised by Stoddard (45), team-teaching projects, and widespread interest in nongrading will result in fundamental reordering of the elementary-school curriculum. Other chapters of this issue report critical re-examination of content at all institutional levels, different approaches to curriculum organization and presentation in various fields, and earlier presentation of content formerly taught at higher grade levels. Such trends at the institutional level should be compared with proposals at the societal level reported earlier in this chapter.

One trend reported in Chapter III deserves emphasis. Rapid accumulation and reordering of knowledge render obsolete the old additive approach to curriculum planning. One alternative, long recognized by some theorists, proposes the selection of a few major principles, ideas, generalizations, or methods of inquiry and the organization of relevant content around them. The need for approaches of this sort is now urgent. Dooley's (10) dissertation, dealing with geographic concepts, and a series of dissertations in the social studies published by Stanford University (1, 12, 14, 31) offered methodological and substantial suggestions for organizing the various fields longitudinally. Until fields of knowledge are viewed and catalogued in this way, schools and school systems attempting to break down the lock step of grade structure will not move far beyond the grade-level, topical placement of subject matter with which we are now plagued. There is no need, however, for the entire process of developing new approaches to be duplicated from the bottom up by each institution. This is the kind of undertaking best assumed by major research centers, which could then disseminate findings for appropriate consideration at the local level.

The college subject-matter specialist increasingly is becoming a self-styled expert in curriculum planning at lower levels of education. Ruml and Morrison (37), however, seriously questioned the ability of college personnel even to plan respectable curriculums at the college level, main-

taining that college departments, in the main, are unable to rise above departmental self-interests to unbiased consideration of what constitutes first-rate general education. Rumi and Morrison recommended increased board study of curriculum questions and the establishment of faculty trustee curriculum committees having powers transcending departmental authority. Goodlad (191) proposed a three-dimensional model for organizing and interrelating data relative to the subject, the learners, and learning processes at both institutional and instructional levels; such a model would provide a basis for balance in curriculum organization, thus avoiding the familiar swing of the pendulum from child-centered to subject centered extremes.

Tjerandsen (460) observed an unfortunate tendency of curriculum recommendations in social-science general education to reduce complex or composite problems to only one, or a few, of the considerations involved. Such reduction, he claimed, ignores the fact that the problem of the curriculum necessarily involves method as well as subject matter, subject matter as well as aims, and some rational organization of these aspects of curriculum into a meaningful pattern. He developed a scheme involving these necessary components and used it to analyze 63 articles in the periodical literature dealing with general education and the social sciences. Among his findings were: (a) With but few exceptions, the papers omitted discussion of aims, or subject matter, or mode of operation, or two of these. (b) Even though several kinds of conclusions about the curriculum were treated, they were not treated in terms of their interrelationships, and thus no structured form of the curriculum emerged. (c) In general, conclusions were offered without appeal to a sufficient range of grounds or sources of data to disclose adequately the reasons for arriving at them. Furthermore, only a few writers indicated their intentional restriction of treatment, suggesting a lack of awareness as to what an adequate treatment should include. It would appear that these social scientists, subject-matter specialists, strike out as curriculum experts.

Tjerandsen's study further supported the conclusion that curriculum is not yet widely established and recognized as a field of disciplined inquiry—with its unique problems, methods, and data-sources—even by educators planning for their own institutions.

In Conclusion

Curriculum study needs theoretical constructs from which hypotheses can be derived and empirically tested with a view to determining, for example, how curriculum content has been established. From this chapter and subsequent ones could be derived a long chapter simply listing the multitude of topics worthy of research. A few are proposed, to suggest the richness of the potential harvest awaiting the eager researcher's whetted scythe:

1. Conceptual systems which identify the major questions to be answered in developing a curriculum must be rigorously formulated. The elements that tie these questions together in a system must be classified; subordinate questions must be identified and classified properly in relation to the major questions; sources of data to be used must be revealed in answering the questions posed by the system; and the relevance of data extracted from these sources must be suggested (18).

2. Theoretical constructs are needed from which research studies may be derived to demonstrate how values and expectations of individuals and groups find their ways through various channels of communication and political (conceived in the broadest sense) structures to influence curriculums.

3. Studies are needed to determine what types of subject matter (languages, for example) are best taught simultaneously, as contrasted with those best taught consecutively.

4. Studies are badly needed to show with rigor and precision how best to arrange material in a field for effective learning. This problem is of broader significance than the traditional problem of grade placement of content. The best solutions will not be forthcoming from analysis of subject matter alone. To lay out material according to some principles of increasing complexity derived from the subject is one thing; to provide sequences of learning opportunities according to insights derived for observing how students of varying abilities and past accomplishments best learn is quite another.

5. Taxonomical analyses of educational objectives must be extended into psychomotor and affective realms, and potential uses of resulting taxonomies must be more thoroughly exploited. In addition, structural analyses of objectives would help to reveal to teachers the range of specific behaviors with which they must cope in seeking to achieve any broad educational goal.

6. Global approaches to the establishment of relationships between curriculum-planning processes and improved instruction and learning must be replaced by research studies more precisely isolating and comparing process-product factors.

7. There is need for further research exploration of the teacher-pupil relationship (as revealed and expressed in the learning-teaching act) examined in the socio-psychological framework of reference groups and role conflict.

It is conceivable that the two-dimensional model developed by Getzels (15) and productively applied to the understanding of administrative behavior (20), supervisory processes (27), and instructional groups (16) could be applied equally productively to the understanding of certain curriculum decision-making processes. Curriculum theorizing to date is best described as abstract speculation; curriculum research as "dust-bowl" empiricism; and curriculum practice as rule-of-thumb guesswork (often a wet thumb, at that, held aloft to test the direction of the prevailing

breezes. Perhaps increasing interest in curriculum as a field, and in curriculum problems generally, will lead to the reporting in subsequent issues of the REVIEW of conceptual schemes which separate logical from empirical questions and point to appropriate sources of data; theoretical constructs which lead to meaningful, cumulative empirical research; and curricular practices which stem from answering appropriate questions with tested data selected from pertinent sources.

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CHAPTER II

Forces Influencing Curriculum

ALICE BRESLOW, JEROME DISQUE, GUNNAR SAUNJORD, ROBERT SMITH, STANLEY SOLES, FRED WILHELMS, and METTA ZAHORSKY

In today's society changes come at a rate never before approached. To cause such rapid change, there must be forces of unprecedented power, and such forces inevitably affect school curriculums. The school authorities who make a decision about a curriculum and the lay groups and individuals who press for such a decision may not realize that they act in response to an underlying force. It may be years before the connection between background factor and specific decision becomes clear, but the choice is no less a response.

The forces are difficult to identify while we are living in the midst of them. And to assess the contribution of each is almost impossible. Long-term shifts in socioeconomic conditions, international relations, and significant values may have more important results than occurrences that are specific, dramatic, and highly visible.

Three categories of forces influencing curriculums and what research says about them are included here:

1. Forces generated by special-interest pressure groups consciously attempting to direct school policy for their own purposes. These probably exert the most commonly identified pressures upon the schools.

2. Forces arising out of general social and technological trends throughout the world, accentuated by the increased communication among nations and the rapidity of scientific development. The immediate effects of these are difficult to analyze.

3. Forces generated by new insights from the scholarly fields, particularly as to the nature of man as a learner, the dynamics of groups, the nature of the school society, and its relation to the larger community. These insights influence decisions at first only in narrow circles. Over a time, however, they furnish an increasing pressure of ideas upon the professional educator and the public.

Specific Pressures of Special-Interest Groups

The turbulent period covered by this review is marked by activity of pseudo experts in education, armed with the results of some measure of inquiry and adroit in techniques of publicity and persuasion, ready to prescribe specific modifications in school and college curriculums.

Ways in Which Pressure Groups Function

One issue of the *Annals of the American Academy of Political and Social Science* (12) provided a range of helpful background material on the ways pressure groups function to influence legislation and to channel public opinion.

Vincent (150) traced the struggle over federal aid to education and described the stands of pressure groups as reflected in testimony on the Educational Finance Bill of 1954. He concluded that a general program of federal support for education foundered on the issue of what to do about auxiliary benefits from federal funds for Roman Catholic schools; and that school construction proposals were hampered by the background struggle over desegregation.

Pressures over Desegregation

Pressures generated by the 1954 and 1955 Supreme Court decisions ruling racial segregation in the schools unconstitutional precipitated a chain of events having far-reaching effects. This topic was also discussed in the October 1959 issue of this REVIEW (41). The Phi Delta Kappa study by Wey and Corey (152), even though it suffered from vagueness, provided guidelines for desegregation programs based on analysis of the experiences of 70 school districts. The experience of these districts indicated that there is no ideal plan for desegregating schools.

Two problems are the possible loss of jobs by Negro teachers and the frequent need to abandon Negro school buildings. (Some buildings have been turned into recreation centers for Negro communities.) The cooperation of the police in taking firm and quick action if needed was found to be essential. So, also, was firmness in adhering to whatever desegregation plan had been agreed upon by the community at the outset. As far as instruction goes, desegregation seems to have stimulated renewed efforts to improve instructional programs for all children. "Students are making more rapid progress toward race acceptance than are parents. When the students now in school become parents, many of the problems that seem insurmountable will decrease in importance" (152).

Suchman, Dean, and Williams (138), drawing on the Cornell Studies in Intergroup Relations, summarized existing knowledge in the field of social science that has promising relevance to desegregation as a social process, posed propositions for research, and outlined needed studies on desegregation processes. Tumin and others (149) found differences in attitudes toward desegregation among white citizens in Guilford County, North Carolina, related to differences in education, social status, and access to mass media—the "hard core" of opposition being centered in the lowest socioeconomic level of the white population. A negative image of the Negroes was common to the white population, but attitudes toward

desegregation ran the gamut from advocacy to willingness to resort to violence in defense of the *status quo*. The study design was significant in two aspects: the use of a team of graduate students to do the study as an aspect of their training in social research and the use of consultative resources drawn from several universities. Giles (56) summarized desegregation experiences in numerous communities, reviewed research bearing on intercultural patterns and issues, and devoted about one-third of his book to curriculum and instructional implications.

In a broader context, Ammoun (3) reported for the United Nations Subcommission on Prevention of Discrimination and Protection of Minorities. A citizen of Lebanon and Special Rapporteur for the Subcommission, Ammoun surveyed UN agencies, governmental and nongovernmental agencies, and the writings of recognized scholars. He reported rapid progress in most nations of the world toward breaking up traditional systems and sanctions for institutionalized discrimination. Discrimination in education based upon race, color, sex, religion, social origin, property, and political or other opinion is on the wane. Legal discrimination has been virtually eliminated except in a few scattered countries. As a political principle, discrimination in education is no longer defended except in a very few places. This does not mean that discrimination has been eliminated in practice, but it is being driven from positions which even a few years ago seemed impregnable.

Pressures of Specialized Interest Groups

Far more extensive research is needed, carefully designed, to assess the impact of special-interest groups on curriculum and instructional procedures and to assess the effect of such pressures on teachers and professors.

Jones (77) reported the plunge of the American Legion into the field of textbook analysis and criticism during the 1940's, including the later shift to interest in citizenship education. Skaife (132) warned schoolmen about the objectives of the Council for Basic Education, as well as about the nature of its personnel and financing. The impact of this group has been widely felt in education. Particular aspects of its program were assessed by Trow (148) and Hand (63, 64). Careful and extensive research to assess the means and processes by which the Council seeks to influence education should provide a basic contribution to knowledge of the operation of pressure groups. Improved ways of responding to pressures on education might emerge.

The impact of power politics on teachers was described by Burton (28), who showed that attacks on teachers regarding subversive activities often led to voluntary censorship by the teachers themselves of discussion of controversial issues. The pressures felt by college teachers of social science were studied extensively by Lazarsfeld and Thielens (90), who reported incidents of dismissal for unorthodox views and associations. They found

the pressures greatest in first-rank institutions, but they also found in such settings the strongest institutional support for freedom to teach.

Deam (40), using a 20-percent sample of Virginia school board members, superintendents, secondary-school principals, and social studies teachers, found most agreed on the need to deal with 20 selected controversial issues; but he found diffidence about treating the strengths of competing political and economic systems and the purported weaknesses of our own institutional arrangements. Deam concluded from the kinds of reservations expressed that the opportunities for high-school students to grapple with the basic issues of our time are in jeopardy; he believed full and free opportunity to study controversial matters—an opportunity crucial to the maintenance of democratic institutions—to be vanishing.

In response to national criticism, organizations of professional educators, with the assistance of their colleagues in fields of liberal arts, scrutinized the entire process of teacher education in an effort to increase its effectiveness. Smith and Robinson (134) described a summer workshop in which educators of teachers, university and college instructors in academic fields, and public-school personnel worked out some new guidelines for teacher education. The report recommended continued co-operative action by representatives of school administration, teacher education, and the academic disciplines to design and improve teacher education programs. State and federal agencies and legislators, private foundations, accreditation agencies, and other citizen groups, through financial assistance and ideological pressure, are also exerting influences upon schools. For the most part, these influences may have a healthy effect in speeding up curriculum change, but in some instances the demand is for a return to practices which the schools have legitimately abandoned. According to Morphet (110), the causative lag in public awareness of the goals and problems of public education is being tackled successfully in some state and local districts by the appointment of representative citizen groups to investigate school policy and make recommendations to boards of education.

General Social and Technological Forces

A school program may be influenced more by certain social and technological trends than by the efforts of individuals or groups. Such trends are hard to assess while we are still in the midst of them, and little scholarly analysis has been made of their impact. Nevertheless, their influence is significant.

The Impact of Foreign Educational Practices on American Education

The launching of Sputnik in the fall of 1957 inaugurated a period of unprecedented interest in European education generally, and in Russian edu-

cation particularly. The "great debate" on education was intensified as a result of the general economic and technological achievements of other nations. Alleged shortcomings and strengths of education in the United States were projected against the background of European educational practices. The rising tide of concern with European education filled professional literature and was reflected in all mass media of communication. A reorientation of the curriculum along traditional European lines was advocated by many, particular emphasis being proposed on mathematics, sciences, and languages. Such American practices as heterogeneous grouping and the use of the comprehensive high school were questioned. Conant (35) defended the comprehensive high school. Concern was voiced that the academically gifted child is not being sufficiently challenged.

Martin (102), analyzing the writings during the years immediately preceding and following the launching of Sputnik, found that evaluations of American education were more frequently "slightly negative" in character during the post-Sputnik year. Movements toward differentiated education for students of varying abilities and toward a particular concern for gifted students were noted. Opinions favoring utilitarian versus liberal education, and those favoring liberal versus utilitarian education, appeared to be evenly divided.

A generalized impatience with the deliberate, "waiting-for-him-to-grow" pace of American education led toward a partly punitive speed-up and a look toward European education as a model. A number of studies comparing achievement here and abroad appeared. Counts (36), in a scholarly work based on original Soviet efforts, traced the ideological sources of Soviet political and educational philosophy. He pointed to the challenge posed by the achievements of Soviet education. Also based on Soviet sources was a study by Korol (84), who, after surveying Soviet education, presented a detailed analysis of Soviet education for science and technology, documenting and evaluating the extent of its achievements.

Studies comparing the performance of European and American children in arithmetic were made by Buswell (29), Bogut (17), and Kramer (85). Buswell (29), comparing English and Californian children of the same chronological age, and using an English test adapted for the purpose as a measure, found English children superior. Bogut (17), using the same test, found children in St. Paul superior to Californian children, but inferior to the English children (although in the latter comparison differences in the problem-solving part of the test seemed small). In interpreting findings both investigators considered such factors as differing grade placement of topics, effects of mobility, effects of special coaching for crucial examinations in England, and teacher preparation. No information was given regarding the comparative total allotment of time for teaching arithmetic.

Tracy (147), using the Buswell version of the English test to compare North Carolinian children with the Californian and English groups, eliminated the race factor and the mobility factor by selecting *white* children from *stable* urban communities. (In discussing the findings from his study,

Buswell had pointed to these two factors, among others, as possibly contributing to the lower achievement of the Californian children.) Though the North Carolinian group scored higher than the Californian group, it still scored significantly lower than the English group, whose superiority was more marked in the computational than in the problem-solving part of the test.

Since the English group was tested at the point of terminal training in arithmetic, a point which is not normally reached in the United States until the eighth grade, Tracy also compared the achievement of English children of age 10.8-11.7 with eighth-grade children in North Carolina and found no significant difference between the achievements of the two groups on the total test. However, the North Carolinian group made relatively higher scores on the problem-solving part of the test, whereas the English group made relatively higher scores on the computational part of the test.

Kramer (85), using an adapted form of the arithmetic section of the *Iowa Tests of Basic Skills* to compare Dutch children in the fifth and sixth grades with Iowan children in grades 5 through 8, found the Dutch children considerably more advanced both in problem-solving ability and in understanding of concepts and processes. In evaluating the results, he considered various factors, including the widely differing allotments of time for arithmetic teaching.

The Kramer study found more drill content and more emphasis on mental arithmetic in Dutch textbooks. In grade placement of arithmetic topics, the Dutch books are approximately one year ahead of the American. More time is allotted to arithmetic in the Dutch schools. The pupil-teacher load in Dutch schools typically is heavier than in American schools. American instructional equipment is typically superior to Dutch. The sixth-grade average performance in the Netherlands was higher than the American eighth-grade average on arithmetic problem-solving. The marked superiority of Dutch pupils at low-ability levels suggested greater selectivity in the Dutch elementary schools as a partial explanation of the difference in over-all means. Performance at top-ability levels was similar for eighth-grade American students and sixth-grade Dutch students. Dutch children outperformed American children by a wide margin, but, when they were compared after a comparable amount of time devoted to formal instruction in arithmetic, their achievement was about the same.

These studies revealed such problems as those of equating age, amount of instruction, and tests used, so that the meaning of the results would be clear. Although these isolated studies indicated some greater specific achievements for European children, investigations comparing over-all effectiveness for long-range goals of foreign and American schools have not been made.

There is the possibility, however, that a thorough review of current practices in the United States will result from the claim that European education is superior. Gilchrist (55), reviewing recent innovations in high-school curriculums, discussed the experimental program in the improvement of

physics instruction at Evanston, Illinois, and the efforts of the Physical Science Study Committee of the Massachusetts Institute of Technology directed by Professor Zacharias. Improvement in mathematics instruction is the goal of projects at Illinois, Yale, and Stanford. Steady revision of foreign language instruction has increased the use of teaching aids, especially tape recorders, and put new emphasis on direct method, in which speaking and hearing the language precedes the reading of it.

Scientists' Influence upon Curriculum

An accelerated scientific and technological revolution was felt in the public schools. Scientists and educators alike re-evaluated their objectives, but evaluation of educational goals was hampered by lack of communication between educators and scientists. The former, trying to interpret scientific and technological trends which will vitally affect the educative process, were handicapped by lack of highly specialized understandings of the narrow disciplines within which scientists work. Scientists, on the other hand, often expected to transfer their training in particular disciplines to the curriculum without understanding the total educative process.

Many scientists have been highly critical of some of the social objectives of education. Some, like Hofstad (67), feared elimination of "the incentive of competition" that a "more fundamental curriculum" would furnish. Others, like Davidon (39), contrasted various American studies of scientific training in the USSR with Soviet reports on their own science education. Still other scientists were concerned with the fragmentation and fractionalization of the scientific disciplines. Meyerhoff (105), for example, took the position that schools and colleges should undergo a "restoration of learning" in the pure sciences to be accomplished by an all-out effort of the local school systems and the federal government.

Less critical than these, however, was a group of scientists and technologists who related the problems of education in a scientific age to the social role which the scientist must play. Rabinowitch (122) argued that we should not "abandon education for life"; that "to prepare our children to meet this dangerous and real world they will face we will have to give more attention to the place of science in the curriculum, since science now is the 'growing tip' of civilization." Many scientists saw a curriculum as primarily intellectual in character. Taylor (141), Schwab (127), and Barnes (7) took such a view. Others, in a variation on the same theme, saw the sciences as more closely related to the humanities. Ashby's "technological humanism" (4) was an intellectual approach to a philosophy of social control earlier voiced by Dewey in his "evaluation of technology" (92).

A last group of scientists came closest to the humanizing (as contrasted with the humanistic) objectives of curriculum. DuBridge (44), for ex-

ample, expressed the hope that students of science could retain the adventurous spirit of exploration which characterizes all investigation of the world of ideas. Taton (140) made a case for the teaching of the history of science as a means of inculcating a more functional understanding of the scientific age. Weaver (151) stated that the average citizen "who fears science should learn about it, so that it can be an exciting intellectual companion and a useful servant."

A few of the scientific and technological journals attempted to evaluate the impact of the scientific revolution on the schools and on society as a whole. DeBurlo (34) noted that the "paradox of the scientific mind" that the "scientist is torn out of his world of universality and integrated into a particularistic system which tends to cultivate science and foster its human implications only for its own survival and prosperity and for the spread of its own dominion." Interestingly, only two of all the journals reviewed (26, 71) devoted any space to discussion of the broader "human implications" of scientific research or technological development. One issue of the *Bulletin of the Atomic Scientists* was devoted to considerations of the social role of scientists as men of social conscience (31) or in the statements by Rabinowitch (121) and Bronowski (23) as citizens with more than a casual voice in political affairs. Still others in this same group like Oppenheimer (115) and Thurring (145), believed that "international communities" of scientists should be established to seek out the implications of scientific development as it is related to policies of nations and broad social change. Significantly, too, this issue of the *Bulletin* was the only publication by scientists in which other disciplines were brought to bear on the problems created by the scientific revolution. In a joint exploration of common problems, specialists in the fields of sociology (123), psychiatry (101), and economic philosophy (124, 125) interpreted the behavioral disciplines; and physicists (95) and chemists (95, 151) interpreted their scientific fields.

Scientific and technological journals occasionally editorialized on curriculum or educational policy. Koontz (83) reflected segments of opinion of the American Medical Association; Hofstad (67), in the *American Scientist*, typified groups critical of public-school curriculums.

Various scientific and technological journals reported studies related to education in a highly specialized framework, dealing primarily with research projects, special training needs, and financial support. Some of the indexes, such as *Biological Abstracts* (11) and *Science* (128), included more items concerning education than heretofore, but such studies were of a highly technical nature.

Studies interpreting various scientific and technological disciplines as these affect curriculums appeared, but sparsity of such publication indicated need for better communication between scientists and educators in joint efforts toward curriculum development.

The Educational Impact of Alienation of Youth from the General Culture

Increasing development of a subculture of adolescents had an impact upon curriculum planning. In some degree adolescents have always set themselves aside from the culture of children and adults but now the adolescent subculture is both more highly organized and more clearly recognized. Alienation of youth from the general culture is evidenced by such things as a rising tide of delinquency (65), increasing influence of adolescent peer groups (155); adolescent fads of dress and speech, the special literature of comics and paperbacks primarily perused by this age group, particular television and motion picture programs for youth, the custom-built, reassembled cars peculiar to teen age drivers (65, 98).

This state of affairs influences educators, for they have a direct obligation to help induct youth into the adult society and to help youth meet its problems. When the two goals conflict, the task of the curriculum worker is complicated. Furthermore, the reaction of the lay citizenry to increasing delinquency and youthful crime, as well as other manifestations of the adolescent subculture, includes a good deal of sheer retaliation and hostility toward youth. Such feelings in the adult citizenry frequently favor "get tough" programs in the schools and, in general, influence curriculum planning.

The social causes for this alienation are manifold and hard to pinpoint. They may well be related to population growth, increased mobility, and urbanization. Miller and Swanson (107) set forth some factors in present day life and family patterns which may be responsible. Parental anxiety is focused on one or two children in the typical modern home, making the children's achievement of independence more difficult than in the days of larger families. (Even though family size has been on the increase in recent years, the size is still small compared to the typical family size of a half-century ago.) Young people today are frequently financial liabilities rather than assets to their parents. The needs of children are often given priority over adult needs, and the heightened unconscious hostility of adults toward young people is reflected in the older age group's harshness to youth. There are many subtle encouragements by mass media toward development of a separate youth culture. Young people face severe value conflicts between competitive individual goals and more socially oriented endeavor, especially in choosing a life occupation and vocational plan. The organization of schools along age-grade lines from kindergarten, and the impersonal atmospheres of many large high schools, may be additional factors.

Sears and others (129) commented upon the unintended effects of a cult of overpermissiveness in the child-rearing practices of some present-day parents. Whereas many parents know that punishment may leave a strongly hostile drive bottled up within a child while eliminating a few

specific responses. some parents have assumed (wrongly, according to Sears and his colleagues) that to avoid punishing their children for aggression they must allow their children's aggression to go unchecked. But permissiveness increases the amount of aggression in the home and child. An angry child is not usually a happy, affectionate, or social child. He may be a source of discomfort to his family and friends and to himself. Overpermissive child-rearing practices may be still another source of youths' alienation from adults.

It is difficult to document the exact amount of increase in delinquency (98). Moore (109) pointed out the lack of uniformity of definitions of delinquency, differences in reporting and handling delinquents, and variations in referrals to other agencies, all of which make it hard to gather accurate information on the extent of juvenile crime. Kvaraceus (87) reported that adolescents are conscious of society's official rules, but that some lower-class adolescents automatically violate certain legal norms by following behavior patterns approved by their socioeconomic groups. In urban centers many activities are illegal today which were accepted as normal adolescent pranks during parents' youth.

Perhaps educators underestimate the drive of adolescents to close the gap between themselves and adults. Carlson and Sullenger (30) reported that Omaha high-school youths desired counseling for the attainment of physical and mental health, charm, successful interpersonal relations, a happy home life, and effectiveness in work and study; in choice of a vocation and use of leisure time; and in development of a philosophy of life. One survey (100) indicated that boys 14 through 16 years of age were more concerned with achievement and gaining emotional and social maturity than with leisure-time interests. Activities which let them assume responsibility or take adult roles at home or work made these boys feel important and useful.

Conflicts between the adolescent subculture and the general culture have resulted in attempts to bring adolescent behavior "in line" with adult perceptions of what it should be, primarily through punitive action. Delinquency studies indicated efforts through legislation to punish deviant behavior. Schools felt pressure toward greater strictness. The popular press, other mass media, and changes in school policies showed a tendency toward more punitive measures. Research is needed to determine the nature, extent, and value of these policies. Studies of the effects of expulsion, exclusion, and exemption should guide further efforts to cope with the behavior of youth.

Educators and community workers intensified their efforts to gain greater understanding of adolescent problems and to provide facilities and personnel to guide adolescents. The Phoenix Youth Study Proposal for Delinquency Reduction (31) is an example, and the school-community projects reported by Kvaraceus (87, 88) are others. The development of child-guidance clinics and their availability to schools constitute an-

other effort to approach the problems of youth positively (143). The need of teachers for greater knowledge about youth has been emphasized in many professional articles.

The alienation of youth from adults may be just one more example of general social trends toward depersonalization and isolation of individuals. Research in mental health (91) identified such alienation as one reason for the general increase in mental disease. It may be desirable that schools consciously "counter-trend" these forces of personal isolation. Drives for power, status, and prestige over others seem to be proportionate to lack of satisfactorily close, intimate, warm relations with others (117).

The Influence of Shifts in Values

Getzels (54) found "sacred values"—democracy, individualism, equality, and human perfectibility or optimism—still cherished, but identified certain "secular" values which are shifting "from work success ethic to sociability; from future-time orientation to present-time orientation; from personal independence to group conformity; from Puritan morality to moral relativism." Younger teachers and principals emphasized the emergent orientation, and older teachers the traditional value patterns. Superior students were found to prefer a traditional orientation, regardless of school and social class. Parochial-school students' values were significantly more traditional than public-school students'. Differences in values were found among students in different types of schools and within schools. However, no significant differences between values held by freshmen and values held by seniors were noted. Whatever values a student brought to the high school were changed little in high school.

The Influence of Changes in Family Life

The meaning for schools of much of the current accumulation of data on family life is not yet clear, although Freeman (52) presented 23 implications for education. Early estimates (78) of the 1960 census results predicted general characteristics of the American family, such as size, composition, urbanization, and economic status. Studies of patterns of family relationships indicated changing roles and functions of family members (25, 104, 156), but no specific trend emerged. Effects of increased mobility were studied in relation to turnover among pupils. Sexton (130) reported as much as 13 percent turnover in some low-income areas and found that frequent change interfered with success in school.

A number of studies of teen-age marriages, which continue to increase, were reported (27, 103, 111). The number of working women increased, as indicated by the National Manpower Council study (112) and Smuts'

historical analysis (135) of the changing role of women in the work world. Nye (113) and Siegel and others (131), studying the effects of mothers' employment upon the adjustment of their children, perceived less detrimental results than had been previously found. This may be the result of better child-care arrangements, of differences in the kinds of women seeking work, of better working arrangements, or of still other related variables. Interest in family research expanded, mostly in the formulation of conceptual frameworks (48) and methodology of study (32).

Mental Health Concerns and the School Program

The mental health movement directed attention to quality of human relationships. In an effort to explain the prevalence of personal unhappiness, marital strife, alcoholism, crime, difficulties in employment, and mental illness in present-day life, attention was focused simultaneously upon social organization, value conflicts, interpersonal relations, and individual life histories. Interdisciplinary research linking many areas of investigation provided, for the first time, a conceptual basis for understanding the individual in his relationships to his primary reference groups and to his society. A breakthrough of discovery is promised in ways to prevent mental illness and promote positive mental health. Jahoda (73) and Smith (133) formulated concepts of positive mental and psychological health in ways that lead to hypotheses that can be tested. Ackerman (1) spelled out the relationships between the mental health of the individual and the functioning processes and values in the family unit and in the wider society to which he belongs, contending that the historical focus on the individual has prevented a perception of the urgency of evaluating mental illness in terms of a family context. A meaningful concept of mental health comprehends the relationship of the functioning of the individual to the human relations patterns of his primary group. Ackerman perceived the ills of individual, family, and society on a continuum.

Schools are taking into account these interrelations between the pupil's effective functioning and that of his family. Parents are involved in curriculum planning; parent-teacher conferences are formally planned; specialists and courses in family life and mental health are being added to school staffs and programs (69, 89). But the attacks upon such efforts as "frills" indicated that they may not be fully successful. Perhaps these well-meant school programs were based upon too naive a formulation of the basic social and psychological processes underlying movement toward more effective functioning. Brim (19) and Kenkel (80) reported no positive conclusions about the usefulness of courses about family life. Hudson (68) indicated the unrealistic content of family-life textbooks for secondary schools. Cumming and Cumming (37) published a dis-

couraging report of their attempts to teach the principles of mental health to a Canadian community. Their direct conceptual approach provoked such hostility and anxiety that it had to be discontinued.

Ojemann and others (114) prepared curriculum materials for elementary and secondary schools on the concepts of mental health; they seem promising, but their usefulness has not yet been fully determined.

Perhaps these efforts simply ran into expected resistances to social change, and particularly to change involving the personality. However, research did not tackle the basic question of the relationship between teaching concepts about effective functioning and the production of effective functioning itself. Apparently the interrelationship is subtle; and methods of instruction, the particular content selected, and the background of teachers assigned to courses dealing with fundamental social and psychological problems may be responsible for negative results. Efforts to apply psychological and social understandings indirectly through community guidance clinics, counseling, and psychiatric consultation with teachers and school personnel fared more successfully (93). Most important of all is the direct application of principles of mental health to all the tasks of education—the basic organization of the school and the curricular experiences of the day.

The Influence of Changes in Group Life

The family studies cited earlier are but one illustration of increased awareness of the interdependence between individual behavior and the group contexts in which the individual lives in this era of increasing automation, urbanization, population growth, and intercommunication.

The development by psychiatrists of therapeutic communities (76) will not come as a surprise to the seasoned educator, who has long projected a school community in which interrelationships of staff would fully facilitate learning, development, and rehabilitation of all the pupils. Understanding of how to organize and promote desirable interrelationships between staff groups and patient groups which arise from attempts to establish therapeutic communities to treat the unemployed, criminal, and mentally ill, should have significance for school administration. Analyses such as that of Zaleznik, Christensen, and Roethlisberger (157) of the total structure of personal interaction around tasks of individuals in business may provide impetus to schools.

Popular interest in Whyte's *The Organization Man* (154) aroused concern about the loss of individuality, and the increasing demand for conformity by organizations. Perhaps some of the attacks upon the schools' emphasis on group life and social goals are a healthy protest against negation of the individual and may not be as damaging as some educators have feared. School life is group life: the manner in which the interrelationships of this group life are organized determines much of what happens to pupils.

Research in school organization developed. Etzioni (45) noted that the usual lines of authority and staff relationships are of necessity reversed in schools. Staff members (teachers) are the "experts" who ultimately implement major goals of the organization, that is, teach. Michael ([illegible]) reviewed innovations in high school organization in a search for determinants of optimum size, and concluded that both small and large schools have their peculiar advantages and disadvantages. He believed that innovations need to be introduced into both types of schools to offset disadvantages created by their largeness or smallness, pointing out that small schools try to increase their status by becoming large schools, whereas large schools break down their organization into units to obtain the advantages peculiar to small schools.

Terrien (142) noted, along the lines of Parkinson's "law" (118)—that as organizations grow in size, the proportion of personnel devoted to administrative duties increases. Thomas (146) found that personnel of smaller units of departments of welfare service evinced greater agreement in their understandings of their roles, greater breadth of conception, higher ethical commitment, and better quality of work performance. Hall (62), examining organizational and administrative processes in 27 Illinois school systems, assessed the quality of education by the degree of diffusion of administrative procedures, or the extent to which certain tasks involved staff members in their execution. Further, the proportions of staff in administrative and supervisory work, specialized instruction, and auxiliary work were compared with the proportions in regular teaching. Quality of education determined in this way was related to the level of expenditure per pupil, but was *not* related to the size of the school. This study used measures which were readily quantifiable and applied adequate statistical procedures to the data.

Lynn (97) found small British schools failing to produce, in proportion to their enrollments, numbers of students who later became scholars, and cited the ability of large schools to attract better teachers as one explanation. Also, in Lynn's opinion, it is difficult for teaching to be efficiently organized in small schools, since pupils studying at several different grade levels are grouped together. He believed the large school provides a more stimulating and competitive atmosphere. The student bodies of the larger schools included more children who had higher measured intelligence (8 percent more students passed per 100 candidates), though the difference was not sufficient to account for the fact that graduates of larger schools won twice as many distinctions per 100 candidates as graduates of smaller schools. Admitting bias in favor of large schools, Lynn did not control the selection of students into large and small schools along socioeconomic lines, nor make allowance for the location of these schools in rural or urban areas, nor the variations in value that parents and others attribute to academic success in different places. The number of academic awards and high test results is, of course, but one criterion for judging the success of a school.

Mass Media and Automatic Teaching

The fact that more television sets are available and that programming has increased has raised questions about effects televiewing may have upon viewers, especially children.

Excessive televiewing as an "escape" was found to be associated with insecurities and dissatisfaction in connection with status among high-school boys by Johnstone (74), and Pearlin (120) found that adults dissatisfied with work or status were partial to "escape" programs. Bailyn (5) found that only 3 percent of the boys in her sample were highly likely to use mass media as an escape, and they were rebellious, independent, and had many problems.

Himmelweit and others (66) refuted a number of myths associated with televiewing. Children did not become more passive as a result of televiewing, their eyesight was not damaged, and their school performance was not affected. Televiewing did not replace reading books or forming friendships. Movie attendance and the reading of comics were reduced. Although viewing habits were sometimes associated with IQ and personality, parents influenced viewing habits more than these two factors. Duller children watched television more than those of higher intelligence; emotional insecurity and maladjustment seem to impel children toward excessive consumption of any available mass medium, including television. If television is available to insecure or maladjusted children, they will view excessively; if not, they will attend movies frequently, listen a great deal to the radio, or devote a large amount of time to reading comics. Children of this type were characterized by being ill at ease with other children, and their teachers often described them as shy and retiring. They preferred plays of two escapist types—adventure-mystery and family serials.

In 1958 the Fund for the Advancement of Education (49) noted that 569 public-school districts made use of regular television in their programs; 117 colleges offered television credit courses; and 241 offered credit for "Continental Classroom," the nationwide network program then offering courses in physics and chemistry. Somewhere almost every college course is offered on television.

In 1952 the Federal Communications Commission decided to reserve one-tenth of the 242 possible TV channels for potential public, educational, noncommercial stations. Studies assessing the effectiveness of TV instruction are now under way. Hagerstown is in the fourth year of a five-year study utilizing six closed-circuit TV channels. Preliminary findings indicated higher achievement scores for students who used educational television, but the findings must be qualified by the fact that students also had teachers and teaching of unusually high quality. Dreher and Beatty (42), in a large-scale experimental study involving the use of matched sections of classes working in a number of subject fields, evaluated the teaching of college courses by television and found it relatively satisfactory. Mastery of sub-

ject matter appeared to be roughly equal in the regular and the television sections; attempts to measure other variables yielded nothing definite.

At the same time at which TV entered the classroom, the "teaching machine" and other automatic teaching devices were added to the list of available "canned" curriculum resources. (See Chapter IV.) How this automation is to be used is an urgent question. Will it displace teachers and add to the impersonalization of school life, or will it free teachers for their primary and unique function as personalizing agents of instruction, specialists in designing constructive interpersonal interaction for pupils?

Impact of Social and Psychological Research Trends upon Curriculums

The methods of behavioral research have yielded much of the knowledge about social forces and their influences upon schools discussed in the preceding sections. Certain trends in research in these disciplines now influence the professional educator and, through him, the curriculum.

Social Groups and the School

The group life of the school is an important part of the social context within which curriculum decisions are made. Research in sociology and social psychology on group life in schools indicated a shift in conceptual focus and a refinement of methodology. The last three years showed a changed emphasis; there was a shift from studies about social class to studies about values, and from studies about classroom social atmosphere to studies about the social climate of the entire school.

For more than a decade educational writings have emphasized the findings of studies which related social class to other variables. Gross (58) thought it possible to conclude that "nearly every phase of school functioning is influenced by the phenomenon of social class." But, he added, many investigators have not noted the negative cases and the variability of educational behavior within each social class. Bronfenbrenner's critical review (22) of studies of social class and child rearing during the last 20 years is illustrative of critiques of both methods and conclusions. He reconciled the many apparent contradictions of the findings of various studies of social class by noting that the studies were done at different times and places. In addition, he noted that innovations in child rearing are accessible to some receptive members of social classes sooner than to others.

Since Hyman (70) reported on how variations in values occur within social classes, researchers have included value considerations as well as factors of social class in their studies. This shift was illustrated by Kohn (82) and Dahlke (38). Parsons (119), utilizing the school class as a unit of analysis, traced what happens as students progress from grade to grade.

He analyzed the way in which the school class operates as a social system in the socialization process.

An important part of the school's function in preparing students for adult roles is the transmission and changing of values. Questions of how the school curriculum can be made more effective in changing students' values arose immediately following the publication of Jacob's conclusion (72) that no significant changes in values of college students could be attributed to the curriculum. Since the curriculum seemed to have little influence on changing values while students were in school, pertinent questions for research became: What influences the acquisition of values? How are values transmitted? How may the school program influence values of pupils? As noted previously, Getzels (54) reviewed the empirical studies of values and saw differences in values among different types of schools and within schools. However, no significant changes in values of students occurred during high-school years. Spindler (136) described how teachers may unwittingly impose their value biases upon students and transmit value conflicts which are present in the culture at large.

One source of information about influences upon the choices and values of students was their subcultures. Some investigators extended the scope of inquiry to include the entire school as a social system. Fielder (47), studying high-school students' perceptions of the hierarchy among student organizations, found a distinct youth subculture. Gordon (57), who studied high-school students, and Freedman (51), who studied college students, found that the student culture built to a peak during the junior year.

Both Gordon and Fielder reported that teachers' judgments of student preferences were inaccurate. Gordon found that school grades were least predictive of student status, and roles in student activities most predictive. Fielder noted the difference between the formal lists of members of school organizations and student comments about their actual membership. The majority of the students were members of the formal organizations of the school, but most of them felt left out and had a sense of estrangement from the school at large, because they were not involved in the power structure. These studies indicated that students develop sets of school norms for behavior, school traditions, and value preferences within the school. Wise curriculum planning would include careful study of student organizations, so that the total education of students would be more deliberate.

The question "To what degree do peers or adults influence decisions and values of adolescents?" was studied by French and others (53), who found that youths rely upon parents in making long-range plans for college, work, marriage, the armed forces, and the like, whereas adolescents are least influenced by parents and more influenced by peers regarding teen-age problems and sex relations. In contrast, Wilson (155) found the role of the school to offset the influence of the family. He reported that the values of the majority of the students in a high school provide a sufficiently significant normative reference to indicate that the ethos of the school

affects student academic achievement, occupational aspiration, and political preferences. For example, Wilson compared the educational aspirations of students from a series of schools, holding constant the parent's occupation. He found that significantly fewer students from the working-class school wanted a college education than students from a predominantly middle-class school, although both groups had parents who were professionals. More research is needed to fit these findings into a scheme which shows how parents, peers, and schools influence values.

The variation of social climate from one school to another has been observed to have important effects upon student choices (34, 74, 155). Coleman (34), in a study of 10 schools, found further evidence of the way the school program, formal and informal, acts to channel student choices along given lines. He believed interscholastic athletics to discourage scholastic attainment, and noted that, in schools which emphasized athletics, students with the highest IQ's did not get the highest grades, whereas in schools without interscholastic athletics, the highest grades were made by students who scored high on IQ tests.

The Interpersonal "Unit" in Psychological Research

Psychology sought what Allport (2) called new "units of measurement." Emphasis, which earlier moved from the part-functioning of organisms, from "faculty" psychology, to study of the "whole person" as an entity, now focused on the interpersonal interaction of individuals. Such a trend can be documented by the growth of research in social psychology (94, 126), group processes (144), interpersonal perception (139), systems of communication (20, 116), and social psychiatry (91). The trend corresponded to that of research in mental health and family structure noted by Ackerman (1).

The subject of study is the individual human being interacting with others. Man's behavior is considered to be jointly determined by the nature of the systems of interaction in which he is functioning and by his own biological and "historical" self which he brings into each relationship. The behavior of some individuals is determined more by their history (15, 16); others, perhaps the more flexible, respond primarily to the forces operating in each situation. Such emphasis is wholly different from the emphasis of the past search for personality "traits." The relatively stable core responses of people are still being investigated (2), but as new methods for changing behavior are identified through work in perception, communication, and group processes, the static personality "trait" is in question. As Blake and Mouton (14) pointed out, "The adjustment of an individual in a group situation is related only in part to personality factors."

The same shift from exclusive concern with the individual to more focus upon interpersonal interaction is an evident trend in psychotherapy. The

use of group psychotherapy increased (13, 81). Bateson and others (10) and Brodey (21) examined family patterns of interaction in an effort to discover how schizophrenia and comparable conditions may emerge. Development of therapeutic communities for psychiatric treatment has been mentioned.

Though it may be some time before these shifts have direct impact upon curriculum planning and classroom procedure, so fundamental a change in approach to the study of persons must in the long run have great effect. If interpersonal interaction is relatively so important in comparison with inner traits as the frontier investigators in psychology assume, then curriculum planning will have to make primary the provision of opportunity for optimal interaction.

Attitudes, Personality, and Education

Educators have long been aware that many attitudes which they attempted to change by presentation of information and by discussion seem too deeply rooted to yield. Ego defenses have been shown to be related to emotionally based attitudes (79). If the attitudes are to change, the defenses may have to change; and, in order to be efficacious, education may have to influence what in the past have been considered the very roots of individual character. The studies of so-called "brainwashing" (46) suggest that it is these character-based attitudes which have been influenced, and influenced by the very same processes which initially built character. Apparently adult character can be changed by strong negative forces; psychotherapy suggests it can likewise be changed by strong positive efforts.

"Understanding" and the Professional Educator

McDonald (99) saw increased understanding of interpersonal interaction as an opportunity for the "profession" of education to further develop. The educator can move away from routine application of teaching techniques and methods as a "craft" to a professional diagnosis of the interpersonal processes of each learning situation and select the appropriate teaching methods from available repertories. Coladarci (33) defined teaching as an act of inquiry, continuously generating and evaluating procedures, reaching tentative or probable conclusions. Involvement of teachers in action research is one evidence of this trend. The teacher is viewed as a maker and tester of hypotheses. Krumboltz and Farquhar (86) demonstrated the superiority of eclectic teaching methods based upon understanding over rigidly applied instructor-centered or student-centered techniques.

Creativity, Cognition, and New Concepts of Intelligence

Intelligence is no longer conceived as stable, unitary, and uninfluenced by environment. Measures jointly determined by native potential of individual selective sensitivity and by exposure to a series of cultural events were sought (108). Guilford (59, 60) reformulated this new construct of intellect, and attention was directed again to studies of thinking and cognition (9, 24).

There was interest in the nature of creativity (50), imagination (8), and scientific innovation, partly a reflection of the space-age valuation of scientific endeavor, and partly a result of better understanding of intelligence. With a changed conception came attempts to locate this talent more efficiently (18). Eventually this research will influence the practice of intelligence testing in schools and the use of intelligence-test results for grouping and instructing pupils.

Learning and Behavioral Goals

Behavioral goals have long been educational objectives, but the significance of defining all learning as behavior change, the learning of new responses, has not yet had its full impact upon educational practices. The most careful studies of behavior change were evaluations of psychotherapy, which provided many indications of the kind of evaluation necessary to assess behavior change in educational settings.

The stimulus-response formula in learning studies led to a search for the elements of classroom interaction which elicit desired pupil responses (99). What pupil responses can be predicted from what teacher behaviors? The intermediary processes which go on between the measurable stimuli (teacher behavior) and obtained response (pupil behavior) are inferred. Motivation, a primary focus in many educational studies in the past, is such an inferred process, and is now questioned as a useful explanatory construct (153). Search for hierarchies of precipitating stimuli, antecedent-consequent relationships, replaced a search for "motives." One of the most provocative discussions of motivation was that of the 1957 Nebraska Symposium on Motivation (75).

As research in psychology moves its focus from rats to human affairs, educators will want to watch developments for applications to curriculums. As Stephens (137) points out: "A current broad attempt to make psychology more useful for education may by-pass educational psychology to some extent." Each educator will want to keep abreast of emerging trends in the basic research into man's behavior.

Conclusion

In a complex society, it is extremely difficult to identify the forces influencing curriculum development. It is even more difficult to trace the

processes through which cultural influences are transmitted into curriculum practices and to relate any specific practice to a societal force or condition. Nonetheless, we know that the values, beliefs, and aspirations of a people do, indeed, find their way into the subjects, topics, and materials studied by learners in educational institutions. One need only examine, at intervals, the courses of studies prepared for use in public-school systems to realize the truth of this last statement.

This chapter reveals a paucity of studies clearly showing the forces now influencing education, the channels through which influences find their way into the schools, and the impact of given beliefs or bodies of knowledge on curriculum practices. The reviewer is forced to sift through a miscellaneous array of studies, theories, and opinions in search of material that appears relevant to the kinds of curriculum decisions that are being made, or should be made. In the process, he is forced to construct both his own theories of curriculums and his own criteria for selecting and interpreting writings that appear to him pertinent to these theories. Consequently, it is improbable that any two persons preparing a chapter such as this would come up with similar sets of references or comparable interpretations. No doubt this lamentable condition will continue until more rigorous conceptual schemes for identifying curriculum questions and data appropriate to their solution are available.

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CHAPTER III

Components of the Curriculum

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THIS CHAPTER attempts to identify four components of the curriculum: (a) objectives, including both behavioral and content components; (b) types and quality of opportunities for learning, including organizing centers for learning; (c) organizing threads and patterns of organization; and (d) evaluation procedures. Careful consideration also has been given to the extent to which studies have turned to promising sources of data. The studies reported are confined to curriculum development up to the point of classroom instruction. The implementation of curriculum components in the classroom is the subject matter of Chapter IV. This chapter is organized in terms of decisions in (a) content areas encompassing all levels of education, (b) elementary education, (c) secondary education, and (d) higher education. Criteria for assessing decision-making processes and needed research are reported at the close of the chapter.

Increased interest and activity in curriculum problems, particularly with regard to content, characterized the years 1957-59. Contributions of large-scale group undertakings to a marked acceleration of demonstrations and studies are illustrated by the annual reports of the Carnegie Corporation (14), the Ford Foundation (33), and the Kellogg Foundation (57); summaries of projects supported by the U. S. Office of Education (93); and the yearbooks and journals of national professional organizations such as the Association for Supervision and Curriculum Development.

In the absence of an adequate conceptual system to guide curriculum decision-making, the literature still relies heavily upon the opinions of competent educators and informed citizens. An attempt has been made to report such studies as are available in addition to selected writings which, though they may not satisfy the criteria of rigorous research, nevertheless accurately reflect the state of the field.

Curriculum Decisions in Selected Content Areas Encompassing All Levels of Education

The rapid increase of knowledge, the scientific achievements of competitor nations, international tensions, and considerable shifting of opinion concerning the superiority of education in American schools contributed to an acceleration of experimentation in reorganizing content areas. Many

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undertakings along these lines had their beginnings in pre-Sputnik days (2, 5, 7, 63, 73). A number of questions concerning content and quality of learning experiences came to the fore. Subject-matter specialists assisted with curriculum revision through analysis of primary sources for basic concepts (6, 44, 63). Several areas were viewed in an international perspective (29, 43, 74).

Large-Group Undertakings

Large-scale demonstration projects were developed, especially in science (44, 63), mathematics (6, 56, 75), and foreign languages (66, 52). The National Defense Education Act of 1958, an expression of national concern for curriculum improvement in these areas, gave impetus to related study. Large-group undertakings usually involved representatives from colleges, universities, and communities, specialists in education, and classroom teachers. Team planning by such groups made possible the designing of larger and more comprehensive research and experimental undertakings than researchers working individually have been able to develop. Substantial grants from various foundations supported many of the studies (44, 58, 63, 86).

The projects cited have several common characteristics: (a) identification of basic concepts and generalizations involved in new theories and knowledge; (b) development of instructional materials to bring new knowledge and ideas into the curriculum; (c) production of instructional materials for the various grade levels from kindergarten through grade 12, and production of materials for teachers; (d) plans for teacher orientation and training in the use of new materials; (e) experimentation and evaluation in selected schools.

Mathematics

Efforts to improve the content of school mathematics courses and instruction in them were widespread. Commissions, committees, and work groups were organized at the national level (71, 73, 74), the state level (2, 50, 95, 96), and around centers such as the ones at Yale University (9), the University of Maryland (55, 56), and the University of Illinois (6, 7, 75). Working groups, especially those at university centers, generally included college and university mathematicians, high-school and elementary-grade teachers, experts in education, representatives of science and technology, and sometimes social scientists and psychologists. Some university centers were directly involved in state programs.

Normative and action research characterized the work of these mathematics groups. The major undertakings included: (a) analysis of modern theories and ideas for identification of basic concepts appropriate for

teaching in the schools; (b) production of new teaching materials; (c) testing of experimental units in the schools; (d) preparation of expository monographs; and (e) production of instructional materials for use in teacher education (7, 9, 55, 56, 75).

Several of the university committees have developed institutes, workshops, and training sessions for teachers and for writing groups as means of expediting the proposed new mathematics curriculum. Pilot schools were used to test new instructional ideas and materials.

Physical Sciences

The Physical Science Study Committee—formed at Massachusetts Institute of Technology in 1956 and including college, university, and industrial physicists, high-school physics teachers, and school and college educators—laid the foundation for a new course in high-school physics. The project aimed to develop a syllabus, a textbook, laboratory apparatus, manuals, teaching films, guides for teachers, and a series of books for supplementary reading. Experimental use of the course in selected high schools, orientation and training of teachers, and evaluation and modification of materials were a part of the operation (30, 31, 32, 63).

Biological Sciences

The Biological Sciences Curriculum Study was established in 1958 by the American Institute of Biological Sciences. A set of recommendations for education from kindergarten through graduate and professional schools is expected to be an outcome of the study. The study members "visualized from the first that such a study necessarily must involve not only the content of the courses, but the entire teaching-learning process at all stages" (44). Attention was given to effective use of mass communications media. The steering committee included professors of biology, high-school biology teachers, science co-ordinators, science educators, personnel of state departments of education, medical and agricultural educators, and university administrators. The major committees dealt with curriculum content, innovations in laboratory instruction, teacher preparation, gifted students, and publications (44, 45).

Social Studies

The National Council for the Social Studies, through its Committee on Concepts and Values, developed a bulletin (72) which defined the scope of the social studies curriculum from the kindergarten through grade 14. The Committee drew upon the thinking of scholars in the social sciences

and stated central principles and values of a free society in the form of 14 themes to guide selection of content. It would be necessary for local school systems to take into account the needs of their learners and communities in drawing implications from this document. In California, a State Central Committee on Social Studies engaged in a similar task, focusing on concepts from the social sciences and on criteria for the selection of content (13). The Committee also gave consideration to child growth and development, the learning process, and the placement and function of the social studies in the curriculum. Questions were also discussed which would assist local schools in developing their programs within the framework established by the California State Department of Education.

A group of doctoral dissertations at Stanford University, each dealing with one basic human activity (3, 27, 37, 76, 78, 80, 81, 88), attempted to identify generalizations that would aid content selection in the social studies. Primary data-sources were analyzed; recognized experts in the various disciplines were consulted. Generalizations were screened by a jury through a rigid set of criteria. Methodologically, an interesting feature of these studies was the fact that only generalizations unanimously approved were included in the findings.

Coordinated Education Center

In a noteworthy project (94) the University of Pittsburgh and the Pittsburgh Public School System established a Coordinated Education Center for research, experimentation, and demonstration throughout the several content areas and from elementary to graduate school. The Center's objective was to encourage action by schools, colleges, and universities to meet the challenges that face education. A unique feature of this project was the effort to articulate major units of the American educational system.

National Curriculum

Some of the large-scale studies tended to support the case for development of a national curriculum, a controversial issue that has emerged since the last reporting period. Hanna (46) proposed a national curriculum laboratory with a team of representative specialists and lay people to develop a comprehensive national design; he asserted that the greatest hope for national survival and for the perpetuation of American values lies in over-all planning and that he believed it possible to achieve national agreement on basic curriculum problems. Subsequently, a conference report (92) recommended that groups be established to define objectives, content, and organization of the public-school curriculum and that a national commission be set up "to deal with priorities and other overriding curriculum matters."

The significant question raised by the national-curriculum issue was "What kinds of curriculum decisions should be made at what levels of our political structure?" The projects under way in mathematics, the physical sciences, the biological sciences, and the social studies resulted in a movement toward similarity and standardization of programs. The extent to which local curriculum workers deal with proposals from national groups in terms of the uniqueness of their own learners and their own values and beliefs will determine the ultimate worth of the large-scale group efforts cited. A particularly useful document to assist in this assessment was Brackenbury's (11), in which he discussed the practicality and usefulness of philosophy in resolving curriculum issues.

Curriculum Decisions in Elementary Education

The years 1957-59 did not bring forth studies in general elementary education of comparable comprehensiveness and magnitude to those reported in the previous section. Several investigations cited above included the elementary school. There follow some studies in elementary education dealing with objectives, curriculum patterns, evaluation, and citizen interest in the school.

Objectives

Although objectives continued to be a primary concern in studies of elementary education, there appeared to be lack of agreement on basic references for determining them. Bridgers (12) found little research focused upon objectives but reported an investigation of the aims of public education as determined by the writings of eight curriculum authorities. The Estvans (28) reported the results of a long-term research project on children's social perception. They used a projective approach based on a life-situation picture series consisting of 14 scenes, each dealing with a basic social function. Their findings are a fundamental source of data for the formulation of elementary-school objectives. They concluded that the nature and development of social perception points to the need for both differentiation and synthesis in school programs, which must be viewed as a whole. Learning experiences of young children should be organized in short, relatively simple units that stress relationships between structure and function. Growth occurs as the child develops increased ability to make more detailed and analytical examination of closely related ideas, to place them in a space-and-time setting, and to integrate them with other bodies of knowledge.

Herrick (48), observing that objectives are generally stated in terms of the educated adult, of persistent problems of living, and of needs of

the child, asserted that the primary objective of public education is "to help children become increasingly competent to meet and deal with the problems of growing up to be constructive, participating members of our society." In an interesting and useful survey of public opinion about the tasks of the public school, Downey (24) ascertained that the regional sub-publics (which included both noneducators and educators in different types of communities) perceive the major function of the elementary school to be the teaching of the three R's.

Several factors seemed to demand re-examination of public-school objectives. Particularly relevant to primary-grade social studies was Crowder's dissertation (20), which showed that certain out-of-school experiences give young children insights that make emphasis on the near-at-hand an approach no longer valid. The influence of television, acquaintance with foreign visitors, and increased use of books in the home suggest the inclusion of content and experiences dealing with people out of the child's immediate environment.

Patterns of Organization

The development of the nongraded elementary school was a significant change in school organization during the period under review and one which has important implications for curriculum organization. Goodlad and Anderson (42) agreed that the removal of grades as the basis of organizational structure is an almost necessary condition for the full development of individual capacities. Their concept of grouping was suggested by study of how children learn skills and concepts. They demonstrated that success of the nongraded plan depends to a high degree upon the imagination used in grouping children for different kinds of learning. Many of the schools described were reported to have adopted a nongraded structure because of dissatisfaction with promotion policies, reporting practices, and other immediate concerns. The nongraded school supports the principle of longitudinal development of children and the search for organizing elements in the curriculum. The substance of the desired longitudinal view is a set of threads or organizing elements, of both behavior and content, running vertically through the curriculum, around which learning activities can be organized. The nongraded school yields a structure worthy of further study to determine methods of providing for continuous pupil progress along the organizing threads of the curriculum. Research needed in this area lies in the further study of these vertical arrangements, as well as in experimentation with horizontal curriculum organization.

Additional experimentation in curriculum organization included multigrade teaching (49), a two-track plan combining graded and nongraded instruction (87), and an integrated kindergarten-primary program (59).

Evaluation

Evaluation of participation in experimental programs revealed (a) improved attitudes toward education, (b) increased attention to needs and interests of learners, (c) increased use of problem-solving rather than "tell-and-do" techniques, and (d) broader use of instructional materials (48). A group of doctoral dissertations at Wayne State University evaluated public-school programs. Galbraith (36) conducted a case study of a school in an industrial city, describing the impact of rapid social change and slum living upon children and their school, and showing how a more life-centered curriculum was developed which influenced the children's total living. Analysis was made of the use of the school group as a medium of change, of the role of leadership, and of the nature of cooperative action by school and community. Coxe's (19) case study of curriculum improvement in the social studies showed how faculty and administrators defined their problems and worked together to resolve them. The participants analyzed and appraised their school programs, observed the impact of the community on children and youth, and created ideas, materials, and processes to improve the social education of the students.

Snyder (84) appraised through interview, questionnaire, and school records the effectiveness of a developmental elementary-school program as revealed by opinions of children, parents, and teachers and by subsequent achievement in junior high school. A major conclusion of her study was that the block plan of school organization in both primary and middle grades, the parent-teacher-pupil conference, and active parent involvement in many phases of the school program are supporting forces to the positive reactions. Sniderman (83), through interviews, observation, and questionnaires, evaluated the long-range effects of a five-year action-research curriculum project. He found that highly active teachers in the project demonstrated continued interest in experimentation, undertook additional formal course work, and exhibited more positive attitudes toward curriculum study than their less active colleagues.

These four studies exemplify the many evaluative appraisals of school programs appearing during the period of this report. Little research emerged which contributed to the development of the theory of evaluation or of new evaluation techniques.

Citizens Look at the Curriculum

A unique effort in public education was that of the Citizens Advisory Committee on School Needs in Detroit (21, 22). Established in February 1957, the Committee spent 18 months determining the city's school needs for the decade 1959-69. Two hundred and seventy citizens organized into committees. They collected data about all of the major aspects of

the public schools through interviews with school personnel, civic leaders, and school officials in other communities, through visits to schools, and through meetings with consultants. Of 181 recommendations to the board of education, several related to the curriculum. Among those approved by the board of education which related specifically to the elementary-school curriculum were recommendations for: (a) self-contained classrooms in grades 1 and 2, (b) a plan whereby a teacher stays with pupils for at least a year, (c) experimentation with placement of social studies and study of language arts in the homerooms of selected schools, (d) expansion of library facilities, (e) study of the effectiveness of auditorium programs, (f) improvement of guidance and counseling services, and (g) an increase in the visiting teacher service.

Research needed on the elementary-school curriculum includes experimental studies of where to teach what (content appropriate to the maturity level of the child), testing of proposals for reorganization, and experiments aimed to resolve such issues as foreign language teaching.

Curriculum Decisions in Secondary Education

Awareness of the inescapable responsibility of the school in a democracy to cultivate individual talents, coupled with a heightened concern for the national need for capable manpower, brought about several projects aimed at improving the secondary-school curriculum, mostly survey studies.

Objectives

In a companion study to an earlier survey of elementary-school objectives by Kearney (54), French and others (34) reported the findings of an extensive appraisal of expectations held for the public high school. Their report, which represented the co-operative endeavor of six national educational agencies, stated secondary-school objectives in universally useful language. Lingren (62) reported a comparative study of the degree to which the "Ten Imperative Needs of Youth" were being met in selected high schools in Pennsylvania.

General Secondary Curriculum Studies

Conant (17) made firsthand observations of 55 high schools in 18 states. His survey sought to determine the extent to which all students are provided for, whether through terminal education or preparatory education for college. The criteria used to evaluate the comprehensiveness of school programs were developed after preliminary visits and were re-

viewed by a group of experienced educators. Among the most important of Conant's 21 specific recommendations were recommendations for an improved counseling system, individualized programs, and general education for all students. Recommended general education includes four years of English, three to four years of social studies (two of history and one of American problems), one year of mathematics in the ninth grade, and at least one year of science in the ninth or tenth grade. Graduation requires completion of at least seven more courses, not including physical education. All students should be urged to elect art and music. Students should be grouped according to ability. Academically talented students should complete four years of mathematics, four years of foreign language, three years of science, and four years of social studies, a total of eighteen courses with homework. Conant's distinguished reputation and integrity gave his report great influence, even though such criteria for determining answers to fundamental curriculum questions as the nature of the learner and the learning process and the unique needs of particular communities were not accorded the consideration they probably deserve.

Several studies of the influence on curriculum of school organization were made; Trump (89) reported experimentation sponsored by the Commission on the Experimental Study of Utilization of the Staff in the Secondary School. Variance in class size, utilization of technological aids, and use of various combinations of both professional and nonprofessional personnel in instruction formed the basis of the experiments. Jurjevich (53) studied the teaching methods, the opportunities for learning experiences, and the outcomes of a three-year junior high-school core program; and he concluded that organizing learning experiences around broad problem areas results in academic and social achievement by students which is as good as, and in most instances better than, achievement in the more traditional organization.

Cornog (18) reported an experimental program associated with the title "School and College Admission with Advanced Standing." The program, initiated in 1951, was designed to revise the content and teaching in secondary schools to make more nearly adequate provision for the education of able youth. Revision was a result of the deliberations of 12 committees. The Committee on Individual Development directed its attention to the student himself; the other 11 dealt with subject matter. The experiment sought not simply to accelerate bright students but rather to provide a program that went beyond memorization. As evidence of acceptance of the program it was noted that 400 schools sent candidates to the May 1957 advanced placement examinations, and the program received endorsement by students, teachers, and parents.

Bissex (10) reported revision and extension of the Newton Plan, an effort to reorganize the curriculum for all subjects, grades 9 through 12. The plan involved experimenting with teaching large groups, giving teachers new roles in research and evaluation, and improving content.

The original phase was concerned with teaching traditional subjects in new ways. New content having the nature of general education offered types of knowledge, understanding, and appreciation usually not gained in regular classes. Exploratory evaluation of the program was provided by the Graduate School of Education of Harvard University after 1957. The evaluation procedure was carried on by researchers in residence who continuously appraised various aspects of the experiment and fed back information necessary to the program's growth. According to the report, outcomes in terms of learning by the students in the Newton Plan and by those in the more traditional program showed no essential differences.

Block-scheduling and core at the junior high-school level were described by Wright (98), who secured data from a survey of a 25-percent sample of 12,052 junior and junior-senior high schools in the United States. The major findings were that 19.3 percent of the sampled schools had block-time classes. This percentage increases to 31.4 percent if only junior high schools are considered; and within them the proportion increases inversely with the grade (94 percent in grade 7, 76 percent in grade 8, and 26 percent in grade 9). English and social studies were the subjects most frequently combined. In more than two-thirds of the schools, block-time classes had been introduced in 1950 or later. The report dealt at length with the procedures the responding schools used to develop core programs.

Jewett's (51) survey analyzed 285 courses of study from 44 states, the District of Columbia, the Canal Zone, and Hawaii. Showing changes which have occurred in the high-school English curriculum during the last quarter century, Jewett told how curriculum work was initiated, guidelines were observed, scope and sequence patterns were determined, provisions were made for individual differences, and promising practices in the language arts were suggested by courses of study. Among the significant changes he cited are: (a) inclusion of developmental reading instruction in many junior high schools, (b) heightened interest in world literature, (c) pupil guidance through speaking and writing, (d) emphasis on critical thinking, (e) determination of adequate scope and sequence, (f) articulation of all divisions of the school system from kindergarten through college, and (g) a concerted effort to instill appreciation of the privileges and obligations of living in a free, democratic society.

Content Areas in Secondary Education

The recommendations of several commissions and study groups reported earlier in this chapter, whose purpose was to establish content-organizing threads in selected subject areas from the kindergarten through grade 12, are expected to affect high-school programs. Several of these organized efforts were initiated at the secondary-school level. For example, the University of Maryland project (55) sought to determine the degree

of maturity required in students for certain mathematical concepts to be taught appropriately and to develop course materials for grades 7 and 8 consistent with their findings. The School Mathematics Study Group (91, which has shared instructional materials and personnel with the Maryland project, similarly advocated greater substance for seventh- and eighth-grade mathematics. Experimental units for these grades developed by the School Mathematics Study Group are being tested in approximately 100 classrooms. Other productions of the Group were materials for the self-improvement of teachers, textbooks for grades 9 through 12, and a series of mathematics monographs for students, teachers, and the educated lay public.

The University of Illinois Committee on School Mathematics (7, 75) sought to establish the unity of mathematics from the first grade through high school, introducing concepts now taught separately as arithmetic, algebra, geometry, trigonometry, and even calculus, appropriately, without regard to age or grade. The high-school program is presently in the developmental stage.

These and similar projects aimed to establish a balance among knowledges, skills, and values, with attention to continuity, sequence, and correlation. They should result in significant revisions of mathematics curriculums in public schools.

The initial emphasis of the Biological Sciences Curriculum Study reported by Grobman (45) was focused at the high-school level and sought to determine what knowledge of the life sciences a citizen should possess upon graduation from high school to understand his world. Land (60), appealing for establishment of functional biology in the secondary-school curriculum, considered fundamental physical principles and descriptions of chemical properties in tenth-grade general biology as keys to popular scientific appreciation, as well as to individual initiative.

The report of the Survey of Physiological Science presented by Gerard (38) emphasized the status and future of physiology as a basic aspect of biological science. The impact of physiology on the national welfare is emphasized along with recommendations for research and teaching. Stanley, Broudy, and Burnett (86) appraised science programs in Illinois secondary schools and made specific recommendations for improvement. The study, which relied upon the quantitative data available from records and from earlier and more definitive studies, dealt more with placement of the various disciplines by grade levels than with specific opportunities for learning.

The central objective of the Physical Science Study as reported by Little (63) was development of courses consistent with what physicists meet in practice. Basic assumptions were: (a) revision of subject matter should be made by practicing specialists; (b) high-school teachers can successfully teach subject matter beyond what they studied in college; and (c) high-school students will respond to intellectual presentation of

subject matter in which rational thought and analysis are more important than memory.

Dooley (23) reported a study involving the compilation and validation of geographic concepts for inclusion in curriculums, grades 1 through 12. A list of 218 concepts compiled from nationally used textbooks in geography and social studies and from randomly chosen curriculum guides was submitted to three juries made up of professors of geography and social studies and professional geographers; they rated them on accuracy, importance in general education, and learnability. The combined juries placed 49 percent of the concepts in grades 1 through 6 and 51 percent in grades 7 through 12.

Curriculum Decisions in Higher Education

The phenomena of foundation support and space-age insecurity gave rise to a number of curriculum demonstrations and studies in higher education. The buttressing of liberal arts subject matter in undergraduate and graduate programs, as well as in professional schools, underlay most curriculum decisions in higher education. Other purposes included (a) further clarification of the relationships between theory and practice in teacher education, (b) refinement and enhancement of professional programs, (c) advancement of interinstitutional co-operation, (d) extension of foreign travel and study, and (e) improvement in teaching methods and conservation of college teaching resources.

General Education

Centers or institutes of higher education were established at several institutions. Among them were: Teachers College, Columbia University; the University of California, Berkeley; University of Michigan; and Michigan State University. Reports from Columbia University (25, 65) raised provocative questions for curriculum decision-making. A survey of faculty attitudes and opinions in eight types of specialized schools brought forth the following issues: (a) the need to determine the best distribution of liberal arts courses through the four undergraduate years, (b) the need to clarify the concept of liberal education among faculties —and the lack of willingness to make contributions to this concept, and (c) the need to make explicit the broad purposes of liberal arts and to reorganize in terms of those purposes. A summary statement (65) called for a liberal arts curriculum for technical and professional students which is more than a direct contribution to specialized training.

Greater emphasis on liberal arts was reflected in undergraduate programs of general education, in graduate schools, and in colleges of education. The Ford Foundation (33) supported programs stressing liberal

arts in general education through curriculum innovations which included (a) combined subject courses in basic areas; (b) emphasis upon independent study, inquiry, and initiative; (c) improved utilization of resources through the use of teaching teams, co-operative teaching, and teaching machines; and (d) variations and flexibility in class sizes and scheduling of the college day, week, and year.

Wayne State University inaugurated its new Monteith College (68) designed to foster qualities of the wise citizen, the cultivated human being and the competent and creative specialist. Though this program attempted to satisfy such criteria for curriculum decision-making as concern for organizing threads and the learning process, its emphasis on the Western World overlooked today's critical need for development of world-wide understanding.

The Carnegie Corporation of New York (14) supported programs to enlarge the role of liberal arts, among them (a) the degree of Doctor of Philosophy in liberal arts for students planning to be undergraduate teachers, (b) a series of courses designed to permit graduate students to sample fields of knowledge outside their own specialties, and (c) intensive exploration of single ideas or concepts in general education. Aside from the introduction of so-called discussion courses, the major emphasis was given to updating of program aims, especially those concerned with "considerations about contemporary society and the particular community for which the curriculum is planned."

The Fund for the Advancement of Education (35) reported 62 grants to 48 institutions to develop plans for more effective use of teaching resources. Independent study figured prominently among these programs. Allen (1) surveyed 170 economics education faculties who reported interested departures from traditional lecture methods.

Curriculum Study in the Professions

The largest grants from foundations went to teacher-preparation institutions. Program innovations in teacher education (33) included (a) paid internships, (b) near-obliteration of "methods courses," (c) use of teaching teams, (d) interinstitutional co-operation, and (e) reorganization of the content of education courses. Woodring's report (97) probably had as great an effect upon teacher education as Conant's report (17) had on the American high school. Woodring concluded that programs supported by the Fund for the Advancement of Education (a) created interest in problems of teacher education, (b) supplied teachers who would not otherwise have entered the profession, (c) surmounted barriers to changes in teacher education, and (d) brought together professional educators and liberal arts faculties.

Fifth-year internships have been an important and usually a preconceived condition of Ford programs, as indicated, for example, in Spaulding

and Krathwohl's (85) excellent but *ex post facto* evaluation of the Arkansas Experiment in Teacher Education. A prolonged internship involved three kinds of learning activities: (a) observation periods, (b) structured course work, and (c) evaluation seminars. Although the evaluation procedures were not systematic, they resulted in some observable program modifications.

While pressure increased for more liberal arts in teacher education, there was evidence that teachers colleges were doing about as well in this direction as liberal arts colleges. Andrews and Palmer (4), surveying 22 institutions in 19 states, observed that elementary-school teachers are required to complete courses of study similar to those in most liberal arts institutions. A parallel study by Cogan (15) of the requirements for secondary-school teachers brought forth similar findings.

Interesting curriculum experiments emerged from continued interest in the oldest of teacher-education problems—the relationship between theory and practice. Colvin (16) developed a series of direct experiences prior to student teaching, enabling student teachers to increase their readiness for supervised teaching. Direct experiences were explored to discover problems and formulate hypotheses to be tested. Dunham (26), using the Minnesota Teacher Attitude Inventory, determined that negative changes in attitude toward youth occur among student teachers during student teaching. Hansen (47) concluded from the results of an action research study of post-degree candidates for teacher certification that "direct experiences can be meaningfully related to theory if cooperative planning occurs." In a study of the timing of methods courses, Nagle (70), using his own tests, showed that integration of methods courses with a six-week period of full-time student teaching is more effective than part-time student teaching preceded by methods courses. Beckman (8) and Miller (67) reported the results of action research and group interaction in recognizing and solving teaching difficulties.

Refinement of graduate and professional programs took place in nursing education and medicine. Sand and Belcher (82) described the tasks and processes used to improve a curriculum in a collegiate school of nursing. Tschudin, Belcher, and Nedelsky (90) showed how faculty members of a school of nursing acquired skill in complex techniques of evaluation. Turner (91) reported a new medical curriculum at Johns Hopkins University which, through reconstitution of courses and rotating internships, resulted in an over-all timesaving of two years.

Studies and programs most significant to curriculum planners were those which fully explored a single curriculum component or showed clearly defined relationships between two or more components. Studies (82, 90) reported above cut across components and delved deeply into individual components. Three studies dealt in depth with data relating strongly to one curriculum component. Morris (69) showed the need for standardization of reporting of accreditation data among professional

teacher-education accrediting associations and their members. Powell (77), studying records of students admitted to college conditionally, found justification for providing educational opportunities for younger students with "borderline" credentials. Lloyd (64) conducted a study in depth of one post-degree certification program analyzing the learning experiences of the students. The study contributed several important hypotheses to be tested, and it implemented changes in other teacher-education programs.

In addition to these valuable sources of data and guides to curriculum planning in higher education, there were two important pronouncements upon the fixing of responsibility for curriculum improvement. Ruml and Morrison (79) showed that college trustees may legitimately concern themselves with more than the economic and financial material relating to curriculum. Issues considered of decisive interest to trustees were (a) remedial courses, (b) science offerings, (c) languages, and (d) a mechanism for determining curriculum design and administration acceptable to faculty, administration, and trustees. Lieberman (61), taking a different point of view, recommended that the choice of teaching methods and media, as well as the means of education, be left to one giant teacher organization. Lieberman's thesis was that local control of education has outlived its usefulness and that such control prevents enlightened decisions on policy, including curriculum policy.

Conclusion

Curriculum theory, though admittedly inadequate, has suggested sources of data to consider in making a wise choice of objectives and in determining appropriate means for their attainment. During these last three years there has been an apparent trend toward emphasis on the definition of the content aspects of objectives. Research and experimentation are needed to define the behavioral aspects of objectives and to show ways to take into account the uniqueness of individuals, communities, and educational institutions.

The heart of an educational program is the learning experiences of the students. What they do, what they think about, what they say and write, what they feel—these determine what they learn. Needed in curriculum theory are models that identify the various components of learning situations to which students may be expected to respond productively. A practical problem is that of bringing the various components of the curriculum together through the setting up of organizing centers for learning. Goodlad (40, 41) suggests three dimensions to be used in accomplishing this synthesis—learners, content, and organizing elements. The studies reported here reveal the need for more definitive research in curriculum organization.

The greatest effort needed is in the area of curriculum theory to "identify the major questions to be answered in developing any instructional program, to reveal the elements that tie these questions together in a system and the elements that separate questions from one another, to identify subordinate questions and classify them properly in relation to major questions, to reveal appropriate data-sources, and to suggest the relevance of data extracted from these sources" (39).

If the curriculum in American schools and colleges is to move from a melange of disaggregate parts, and if decision-making is to become scientific, major efforts in the decade ahead must focus on the formulation of a theoretical structure which will guide the design of meaningful research studies.

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CHAPTER IV

Teaching

ARNO A. BELLACK and DWAYNE HUEBNER

A CHAPTER on teaching in an issue of the REVIEW devoted to curriculum planning and development is justified more by theoretical need than by the existence of research which can clearly be categorized under the label, "teaching." Educators turn to many other categories which pull together information and ideas related to teaching. In recent REVIEW issues, Ellis (14) examined writings dealing with instructional procedures in secondary schools, and Leavitt (33) reviewed the literature on teacher-pupil relationships in elementary schools. In the third edition of the *Encyclopedia of Educational Research*, writings related to teaching were summarized by Stiles (55) under "Instruction" and by Wingo (63) under "Methods of Teaching."

In summarizing literature on different aspects of the same phenomena, Barr and Jones (3) stated that the primary factors of teaching have been ignored and that only surface aspects have been studied. This opinion is not uncommon today. Dodes (12), reviewing studies from 1900-1955 in order to suggest measures for solidifying the background of pedagogical knowledge, concluded that the dearth of scientific evidence is the result, in part, of ready acceptance of mere opinion and of a lack of clarity in terminology. The need to study teacher behavior in a context of theory was emphasized by Ryans (47), and it is this recurring theme which justifies inclusion of a chapter on teaching in this issue of the REVIEW.

Whatever schools do or are expected to do, most educators would agree that teachers are expected to, and do, teach. Of all researchers in education, those who claim the curriculum as their field of inquiry presumably have the greatest interest in teaching. One would assume, therefore, that curriculum research would focus major attention on teaching in order to understand it and thereby gain greater control over it. However, teaching has seldom been studied by curriculum researchers as a social or educational phenomenon in its own terms. For example, the comprehensive review of 25 years of educational research (1) published in 1956 reported not one study focused directly on teaching.

During the three-year period of this review, researchers have continued to study (a) effectiveness of teaching and prediction of teacher success, (b) teacher-student relationships, and (c) methods and styles of teaching. There is, however, a growing interest in the study of teaching as such.

In addition to researches grouped under the three categories listed above, this chapter also reports, in the section entitled "Concepts of Teaching," studies which have been developed along the lines suggested in the preceding paragraph.

Effectiveness of Teaching and Prediction of Teaching Success

The recent review by Barr and Jones (3) and the critical analyses of the progress and problems of research related to teacher effectiveness by Mitzel (36) and Ryans (46) make unnecessary extensive review of that subject matter here. However, the focus of this chapter warrants some discussion of the implications of the research for the study of teaching.

Research in teacher effectiveness has frequently bypassed the fundamental problem of identifying or conceptualizing the teaching process. Describing teaching was treated as ancillary to the value problem of identifying the criteria of teacher effectiveness. Predictors have been identified in terms of ease of measurement or common-sense relation to the criteria. The obvious link between criterion and predictor, the teaching act, has been ignored or relegated to secondary importance. Using Mitzel's (36) terms, if process criteria are used rather than product or presage criteria, then the researcher might focus on some aspects of the teaching act; but all too frequently these aspects have not been made to compose a systematic description or theory of teaching. Consequently, each researcher has been inclined to conceptualize aspects of the process in terms of his own research needs or competencies, and not in terms of the profession's need for continual refinement and systematization of the concepts used to grasp the components of teaching.

Cogan (8, 9) illustrated this tendency. By categorizing teacher behavior as inclusive, preclusive, and conjunctive, he added to the store of concepts used for this purpose—which already includes such well-known concepts as authoritarian, democratic, teacher-centered, and integrative behavior. Although he contributed to the solution of the criterion problem by proposing measures of required and self-initiated student work, he contributed little toward a stricter conceptual structure for viewing teaching. In fairness, this probably was not Cogan's intent; yet it would seem that all researchers who try to structure the teaching act conceptually should also seek to contribute to the development of better theories of teaching.

Teacher-Student Relationship

Many researchers continue to focus on the relationship between teacher and pupils in an effort to identify theoretical tools which will facilitate more intensive analysis of teaching with greater cumulative effect. In a

controlled study of 74 secondary-school teachers, Page (40) found that free comments on the students' objective test papers resulted in higher test scores on future tests than limited, controlled comments. By controlled testing of six different approaches, Torrance and Mason (58) concluded that factual, low-pressure techniques were more effective in influencing air crewmen than techniques which depended on persuasiveness or example-setting.

Kounin and Gump (31) studied the techniques of kindergarten teachers in disciplining individual children and the spread of effects to other children. The dimensions of discipline that they investigated were clarity of directions, firmness, and roughness; and the dimensions of pupil behavior investigated were lack of reaction, behavior disruption, conformance, and nonconformance. Clarity of the teacher's direction was related to increased conformance, and roughness to increased behavior disruption, but firmness had no predictable influence on audience children.

Investigators focused on several factors as they moved from descriptive studies of classroom behavior to those which attempted to uncover possible causal factors in teacher-pupil relationships. Gage (17) summarized a number of studies related to teacher perception of students, in which teachers predicted or estimated certain responses of the pupils. In general, he found that the correlation between the accuracy of the teacher's perception and his effectiveness, as rated by the pupils, did not differ significantly from zero. The studies were grounded in a theoretical structure, perception being one element; hence, the findings could help refine the theoretical framework.

Evidence obtained by Gronlund and Whitney (22) indicated that teachers who accurately judged the sociometric status of children were also accurate in judging intelligence. It would be helpful if Gronlund and Whitney's data could be related to Gage's findings. Beilin and Werner (5) found that, of 39 high-school teachers, men and women frequently used different criteria to select from questionnaire results the students best adjusted and most poorly adjusted. Smitter (53) reported a lack of relationship between teachers' apparent knowledge of the causes of children's misbehavior and the kinds of punishment they would use.

Several researchers focused on the values and attitudes of teachers as possible predictors of teacher-student relationships. Battle (4) was able to show that the degree of similarity between the pupil's value pattern and the teacher's ideal value pattern was related to the teacher's estimate of pupil achievement. Bowie (6) uncovered evidence that the teacher's verbal behavior in the classroom was influenced by his value patterns as identified by the *Allport-Vernon-Lindzey Value Scale*. She categorized the teacher's verbal behavior in terms of role-taking processes (feeling tone) and ideational content (ideas expressed), which implied a theoretical structuring of teaching. If she had contrasted this structure with other theoretical statements, she also would have contributed to the de-

velopment of a theory of teaching. In another study of the verbal behavior of teachers, Ravitz (44) found support for his hypothesis that teachers' verbal behavior reflected their concern for self or for students, as identified by a semantic differential inventory.

Three other studies attempted to relate teacher-pupil rapport to other personality indices. Dodge and Clifton (13), using student teachers as subjects, found middle-range correlations between their scores on a teacher-pupil rapport scale and on peers' ratings of social characteristics, professors' estimates of teaching ability, and cumulative grade averages. Sheldon, Coale, and Copple (48) reported that students scoring high on the *Minnesota Teacher Attitude Inventory* and on four scales of the *Minnesota Multiphasic Personality Inventory* differed significantly from low-scoring students in intelligence, authoritarianism, and certain manifest and latent needs. Rabinowitz and Rosenbaum (43) were unable to predict the teacher-pupil rapport of first-year teachers, as measured by a pupil inventory, from test data obtained in their senior year of college.

An idea expressed by Williams (62), Washburne (60), and Gordon (20) would seem to hold much promise for a different attack on the problem of student-teacher rapport. All three believed the relationship between teacher and student to be influenced by the tension between the institutional role of the teacher, as determined, for instance, by the principal, and the personal role that the teacher has developed. To cast the teacher-pupil relationship into a sociological framework of reference groups and role conflict might produce fruitful conceptions of the teaching act.

Interpretation of studies is also handicapped by the lack of adequate theorizing about teaching. Lack of a framework leads to difficulty in organizing or comparing. Without conscious attention to the theoretical structure of empirical studies, researches in teaching cannot be cumulative and build on their predecessors, except to refine techniques and method.

Methods and Styles of Teaching

During recent decades the most common approach to the study of teaching has been comparison of contrasting methods, usually identified as "teacher-centered" versus "student-centered" or "authoritarian" versus "democratic." Several studies which followed this direction were reported. Krumboltz and Farquhar (32) investigated achievement and motivational outcomes associated with the traditional instructor-centered and student-centered teaching procedures. They also included an "eclectic" procedure, a combination of the two extremes, which included student participation with instructor-led discussions and lectures. Results tended to show that students taught by eclectic methods were most highly motivated.

Novak (38), investigating "project-centered" and "lecture" methods used in teaching college biology, found that the project-centered methods

provided better for individual differences. Thompson and Tom (57), studying the effectiveness of pupil-centered versus teacher-centered patterns in teaching vocational agriculture, observed the pupil-centered method to be superior in some respects to the conventional, teacher-centered approach, and in no respects inferior to it. Haigh and Schmidt (23) demonstrated that for college students permitted to choose either teacher-centered or "group-centered" classes in psychology there were no significant differences in subject matter learned. Palmer and Verner (41) examined lecture, discussion, and lecture-discussion methods of class instruction in adult-education classes. In a review of the applications of research in social psychology to teaching, McNeil (35) interestingly described the characteristics of two imaginary schools, one of which embodied the findings of nondirective principles and the other of directive principles.

Three investigations were reported which dealt with teaching procedures associated with "directed" and "independent" discovery in learning. Kittell's (30) study demonstrated that groups given an intermediate amount of direction, in the form of underlying principles, retained and transferred more than groups given less or more direction. Craig (10) reported that increased direction of discovery activities effects increases in learning without accompanying losses in retention or transfer. Kersh (29) showed that the superiority of independent-discovery procedures of learning over procedures with "external direction" was to be explained in terms of increased student motivation rather than of the "meaningfulness" of the learning.

"Large-group" versus "small-group" instructional procedures were also the focus of attention. Nachman and Opochinsky (37) compared the achievement, as measured by examination performance, of college students in a small class with a matched group of students in a large class. Results showed that students in the small class made higher scores on quizzes that specifically covered material presented in the classroom and not prepared by the students, but that the two groups did equally well on final examinations for which they had studied.

Siegel, Macomber, and Adams (49) reported an extensive study which compared the learning outcomes of large-group and small-group instruction on the college level. Achievement of students as measured by final examinations was as good in large groups as in small. Students with high ability performed equally well on tests regardless of instructional procedures, whereas students with low ability occasionally suffered by assignment to a large class. Test results in critical thinking and attitude change did not consistently favor the experimental large-group instruction. Students in experimental (large-group) sections tended to rate their instructors and courses somewhat less favorably than students in control (small-group) sections. McKenna (34) reviewed the research on class size conducted by a research institute at Columbia University over a 15-

year period and observed that there is no one arbitrary class size that can be defended for all school systems or for all levels.

Two significant critical analyses of research dealing with contrasting teaching approaches appeared. Anderson (2), examining 49 experimental studies in which "authoritarian" leadership was compared with "democratic" leadership on the basis of productivity and morale, found evidence lacking to show that either type of leadership is consistently associated with high productivity. In the educational setting, morale appears to be higher under learner-directed conditions, at least when anxiety over grades is reduced. Anderson saw four factors as contributing to make findings confused and contradictory: (a) lack of methodological rigor and inadequate research design, (b) lack of familiarity with other research, (c) lack of precision in operational definitions of leadership styles, and (d) low level of empiricism of research undertaken. Explaining the significance of the last factor, Anderson observed that teacher-centered and learner-centered methods have been repeatedly investigated not with a view to determining *how* one would lead to superior learning, but merely with a view to finding out *if* one style is superior. He concluded that the authoritarian-democratic construct provides an inadequate conceptualization of leadership behavior.

Oliver (39) traced the history of the "unit" concept in social studies teaching and reviewed its effectiveness in contrast to the traditional "assignment-recitation" approach. With factual retention as the outcome measured, he found that research results revealed no striking evidence of superiority of the unit method. His extensive review of the theory and practice led him to question whether the unit concept is useful. He urged careful tests of teaching procedures premised on a theory of how thinking is developed.

All the above studies have something of importance to say about instructional techniques, but they are most meaningful as providing data about specific aspects of teaching or as helping a reader form his own concept of teaching. The isolated study remains isolated unless it is tied to other studies by a practical field problem, or unless it is seen in relationship to other studies by means of some theoretical framework.

Concepts of Teaching

Other studies focused attention directly on the processes of teaching, and the roles, functions, and behavior of teachers. Approaches varied widely: some authors drew implications for teaching from research and speculation in psychology, philosophy, and sociology; some developed relationships between teaching and therapy; some studied teaching in its own terms, rather than as derivative of other fields. Few studies were experimental; mainly they emphasized the development of conceptual

(theoretical) frameworks within which experimental investigations may proceed.

Psychology has long been a significant source of ideas about teaching. Fleming (15) set forth a view based largely on findings of psychological research. She identified six functions of the teacher: she identified the teacher as student of motivation, promoter of learning, observer of growth, craftsman and technician, experimenter, and administrator and therapist. Burton (7) proposed a set of principles of teaching consisting of inferences drawn from principles of learning. Hively (26) discussed the implications of Skinner's reinforcement theory of learning for the development of teaching machines.

The recent publication of the papers delivered at the Conference on the Art and Science of Automatic Teaching of Verbal and Symbolic Skills (18) called increased attention to the theory of teaching and the interrelationships among diverse studies; for, as Galanter states (19), teaching machines "are a theory of teaching." The problems of programing, pacing, prompting, and reinforcement are problems common to all teachers, although perhaps not conceived in the same way. The technical demands involved in producing and using teaching machines should certainly force the curriculum and teaching theorist to a more careful dissection of the teaching act. An inclusive annotated bibliography on teaching machines was compiled by Fry, Bryan, and Rigney (16).

Relationships between teaching and therapy were discussed by four authors. In Rogers' (45) view, a teacher cannot "teach" a learner new concepts and responses; rather, the best teaching emerges from a teacher-learner relationship in which the former is accepting and permissive and the latter makes relevant discoveries himself. Stovsky (56) presented the psychotherapeutic view that teaching is basically an interpersonal relationship whose purpose is control or reduction of anxiety and that it thus promotes learning.

Watson (61) saw a close relationshp between therapy and teaching. He conceived teaching as the organization of interpersonal interactions in groups to convey meanings that meet personal needs and interests. In his view, individual tutoring is "therapy," and all forms of group treatment are "teaching." Tyler (59) discussed five basic concepts of psychoanalytic theory and practice that have values for the theory and practice of teaching: the unconscious, the instincts, repression, structure of mental apparatus, and development of personality.

Views of teaching evolved from logic and theory of knowledge were developed by four authors. Henderson (25) identified two basic forms of knowledge, "know-how" and "know-that," which are the concern of teachers, and he made proposals for the preparation of teachers in the logical foundations of their work. Smith (51) explored the relevance of logic to thinking and teaching and proposed that "educational logic" should be a part of teacher preparation. He contended that the reduction

of thinking to psychological processes has left teachers without an adequate criterion for disciplined reasoning. Cunningham (11) identified communication as the key in teacher-student relationships, and language as the major communicative device. He proposed, therefore, that the teacher must understand the logical characteristics of language if he is to be effective. Plochmann (42) analyzed the logic of the process of communication in teaching systems of knowledge, particularly the problems of breaking down the systems for transmission and resynthesizing them in the mind of the learner.

The sociological concept of "role" has become useful in viewing the functions of the teacher. Havighurst and Neugarten (24) interpreted the teacher's role as composite of several sub-roles in relation to students: mediator of learning, disciplinarian, parent-substitute, judge, confidant, and surrogate of middle-class morality. Grambs (21) distinguished two categories of the teacher's role: director of learning and mediator of the culture. Spindler (54) viewed the teaching role as that of cultural transmission with special attention to the transmission of patterned conflicts in values.

Huebner (27) developed a conceptual scheme designed to facilitate understanding of the relationship between action in the elementary-school classroom and the educational outcomes of such action. Stressing the need for conceptual consistency, he attempted to use concepts derived from a unified behavioral theory to look at classroom action and educational outcomes. He suggested certain classroom actions that might best serve as focal points for observation in order to predict outcomes.

Experimental investigations dealing with the teaching process were carried forward by Smith and others (50, 52) and Hughes and others (28). Smith reported results of the first phase of a five-year investigation into the logic of teaching in secondary schools. His search for the logical structure of teaching took the form of a study in natural history; it was classificatory and descriptive. The authors contended that this is a stage of investigation which must be worked out before teaching can be understood in its own right, rather than as a system of principles and practices supposedly derived from philosophy and psychology; they believed that they clearly established the existence of logical operations in teaching and that some of these operations are significantly more prevalent than others, notably those of *describing*, *designating*, and *explaining*, in that order. With respect to logical operations within the various subject fields, the conclusion tentatively reached was that differences may exist among teachers and among fields in the extent to which the logical operations are employed.

Hughes and others (28) reported a study with a twofold purpose: development of (a) a definition of good teaching and (b) means for assessment of the quality of teaching. Teaching was defined as "the interaction of teacher with child or group." Basic data were specimen records

of the behavior of 41 teachers in three states, all of whom were judged to be "good" teachers by administrators or supervisors. Through the study of the data gathered, 31 teaching functions were identified and organized in seven categories: controlling function, imposition of teacher, facilitating function, functions that develop content, functions that serve as response, functions of positive affectivity, and functions of negative affectivity. The most frequent and pervasive functions performed by teachers were in the category of *controlling*. For most teachers the acts of control were well over 40 percent of all teaching acts. The consequences of the categorized functions were examined in terms of authors' view of desirable objectives of education, and a model of "good" teaching was proposed in the light of responses required by teachers to fulfill these objectives.

Conclusions

Review of the last three years' research supports the contention that recent modes of inquiry have not been very fruitful. New approaches are called for. The study of teaching in its own terms as illustrated by the writings cited in the last section is a promising approach. Smith (50) has stated this well: "Teaching is a natural phenomenon related to the cultural survival of a people, as reproduction is related to their cultural survival. Teaching has its own forms, its own constituent elements, its own problems and its own regularities. It takes place under a stable set of conditions—time limits, authority figures, limited ability of students, institutional structures, etc. All these considerations support the conclusion that teaching is to be studied in its own right if we would understand it and thereby gain control over it."

The researcher who is interested in the testing, refinement, and development of new concepts and theoretical systems has a life's work. The phenomena of teaching are there to be described and analyzed. From such efforts, explanatory and predictive theory is possible. But to develop such theory, the "conventional wisdom" of the educator and the educational researcher must be challenged. This is the function of research. Too few of the studies referred to here move from empirical data to an evaluation of the concepts used to organize these data.

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CHAPTER V

Administrative Structure and Processes in Curriculum Development

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THEORIES AND concepts of curriculums come into operational being, are nurtured and, hopefully, improved through administrative processes and structures. This chapter reviews the literature of the last three years bearing on the relation between these administrative structures and their processes, and the curriculum. It is organized into four major categories: (a) supervisory and administrative roles, (b) patterns of inservice education, (c) physical facilities and instructional materials, and (d) school structure and organization.

Supervisory and Administrative Roles in Curriculum Development

Cammarota (26), Clark (31), Jensen (60), Krug (67), and the Association for Supervision and Curriculum Development 1960 Yearbook (10) indicate that the all-encompassing role of the administrator as a leader in curriculum development must be developed without challenging or deterring the leadership function of members of the staff. Dutton and Hockett (38) and McSwain (75) propose that the principal's essential leadership function is to promote co-operative action on curriculum, not only within the school staff, but also in the school community.

Frazier, in (11), saw leadership as composed of functions necessary to group maintenance and to furtherance of group purposes, but did not delineate the component parts and their relationships to curriculum. Grant (49) recognized the principal's function as a leader, but observed that few curriculum or instructional changes result from staff work except as there have been changes in the values, understandings, and skills of teachers. Grant's concept of leadership, though widely accepted, is not based on substantial research.

Arnheim (8), Cammarota (26), Frazier (11), Jensen (60), Krug (67), and Spalding (101), discussing the principal's role in curriculum development, stressed the importance of his understanding of people, skill in identifying and defining educational problems, and ability to develop procedures for solving problems and for evaluating plans of action.

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Wiles and Grobman (110) reviewed the Sugg study (103) of the operational roles of the principal as these roles are defined by the character of the principal's relationships with the individual teacher, the total staff, and the school community. Sugg found the faculty readier for curriculum change in the elementary school administered by a democratic principal than in the school where the status leader was not democratic. That no relationship was found in the secondary school between readiness for change and operational pattern was explained on the basis of the secondary-school department head's being more influential in dealing with instructional matters than the principal.

There were few studies of the role of the administrator in dealing with particular problems of curriculum. Jameson and Hicks (59) observed use of the same procedures to deal with specific instructional problems as with problems of over-all curriculum improvement. Arnheim (8) saw provision for equitable staff use of instructional materials as a principal's problem. Spalding (101) advocated broadening of the principal's responsibility to include all of the curriculum activities of a school, arguing that he is the one person concerned with all aspects of the educational program.

A critical problem not developed in the literature is that of dealing effectively with the overlapping responsibilities and roles of principals, supervisors, curriculum directors, and superintendents. The role of the supervisor in curriculum development is usually separated from administrative roles. Foster (42), studying 40 elementary supervisors and 50 teachers, observed that both perceived the role of the supervisor as having to do primarily with on-the-job training of teachers. Adams and Bowie (3), Clark (31), and Laing (68) saw supervision as concerned with improving the quality of all learning opportunities, and the supervisor's role as that of a service agent, not a line officer. Little evidence, however, was presented to buttress their propositions.

Inservice Education and Curriculum Development

Much curriculum development takes place in, or is the result of, inservice education. Writings dealt with techniques of inservice education, patterns of personnel involvement, organization of inservice work, work products (handbooks, resource units, and the like), evaluation of inservice programs, resources, and motivation of teacher participation.

Techniques of Inservice Education

Taylor (105), using a stratified, random, proportional sample of 100 public senior high schools in Indiana, observed the following techniques in secondary inservice programs: (a) pre- and post-sessions with pay

(found especially in large schools); (b) development of a professional library with a place for browsing; (c) regular faculty meetings during the school day; (d) teacher committees working with the board of education and the administration on salary schedules that reward teacher growth; (e) teacher committees making community surveys in connection with curriculum development; (f) faculty committees studying school problems, experimenting, and evaluating; (g) visiting of classes by teachers in their own schools or others; (h) special programs for induction of new teachers; (i) small-group study of the curriculum; and (j) provision for sabbatical leave. Taylor found a wide variation among schools in the use of these techniques.

Teachers in Idaho surveyed by Daines (35) indicated the workshop to be their preferred method of inservice education. Sims (99) found workshop technique considered by teachers in Topeka to be very useful for inservice growth in science. Applegate (7), surveying inservice programs of a 25-percent, stratified, random sample of Minnesota schools, found that over 60 percent had workshops in 1955 and 75 percent expected to have them in 1956. Despite Applegate's finding of increasing use of workshops, they were not rated highly by teachers. There was no evidence as to whether workshop experience produced significant change in the behavior of teachers.

Lonsdale and Marshall (72) observed a California method whereby a principal and a consultant work with an experienced teacher to prepare and develop a demonstration lesson which is followed by a faculty meeting to relate the reactions of observers to improved teaching practices. Hedges and others (55) described observations of curriculum practices in outstanding schools of other states by teachers and principals of Morehouse Parish, Louisiana.

Many curriculum workers and administrators have great confidence in university or college course work as an inservice device. Alexander (5), studying co-operation between Dade County and the University of Miami, reported the following patterns: summer workshops of two- or three-week duration; seminars for persons in specialized positions, e.g., the principal; practicums for entire faculties; practicums for supervisory teachers; after-school lecture series; and specialized campus courses offered on an inservice basis for Dade County personnel only.

In these reports, no information is given as to what effect the classes, visits, and demonstration programs had on the attitudes and understandings of participating teachers, or on the instructional practices and programs of the schools involved.

Patterns of Personnel Involvement

Berge, Harris, and Walden (18) found three major patterns of personnel involvement in inservice programs: (a) centralized approach—

curriculum development by the central office; (b) decentralized approach—curriculum development by the school staff; and (c) centrally co-ordinated approach—central staff aid to teachers. The researchers, using guidelines suggested by Parker (89), rated the centrally co-ordinated approach highest.

The importance of the role of teachers in the selection of problems for study was observed by Daines (35), Taylor (104), and Krebs (66). Daines reported disagreement between administrators and teachers in Idaho as to what problems were important to study in an inservice project.

The use of consultants in programs of inservice education is a widespread pattern. Richardson (94) described the use of college and university staffs to help school districts in New Jersey improve their science programs. Alexander (5) believed that an effective inservice program can be fostered by co-operation between public-school consultants and those from university faculties.

Taylor (105) observed the absence in an Indiana sample of lay co-operation in curriculum development, but Bienvenu (21) reported utilization of lay people in 12 school systems co-operating directly with the Joint Council on Economic Education. Lay participation was described in Ayars' evaluation (13) of five community resources workshops. Berge, Harris, and Walden (18) showed that school systems using the centrally co-ordinated approach to inservice education made frequent use of lay people.

In the literature concerning the patterns of personnel involvement, however, many problems seem not to be recognized: the effect of curriculum problems on personnel structure; the nature and purpose of educational decisions, and authority for such decisions; and the effectiveness of alternative staff organizations for curriculum work.

Problem Areas for Organizing Inservice Education

Daines (35) stated five problems most often selected by teachers for inservice study: (a) providing for slow learners; (b) providing for fast learners; (c) providing for children with behavior problems; (d) developing skills for independent word attack at different reading levels; (e) developing the feeling of confidence, security, and belonging in children. Brandt and Perkins (22) reported that the teachers' participation in child-study programs of the University of Maryland's Institute of Child Study did not affect their pupils' reading and arithmetic achievements, but resulted in more positive ways of working with children and more democratic classroom organization.

Alexander (5), Weiss (108), and Nelson (84) reported interest in child study in inservice programs. Nelson (84) also reported attention in inservice programs in California to supervision and co-ordination, serv-

ices to secondary schools, kindergarten programs, outdoor education, evaluation of instructional materials, and all the subject areas. Berge, Harris, and Walden (18), however, found that when individual school groups determined their own plans of action, they stressed child study, guidance, and human relations most frequently, although most of the subject-matter areas received some attention.

Work Products

Applegate (7) revealed that teachers' handbooks were prepared in about half of the sampled Minnesota schools; in 42 percent, the central office staffs prepared them. All teachers ranked preparation of the handbook among the top three of 25 selected inservice practices. Koch (64) reported that statements of city-wide educational philosophy, as well as local-school philosophy, were prepared in St. Paul. Berge, Harris, and Walden (18) showed that the development of teacher guides and courses of study, revision of reporting systems, and long-range planning of course offerings were staff enterprises which occurred frequently. Scope and sequence charts in economic education were developed or adapted from those produced by workshops in California, Indiana, and Ohio (21).

Nelson's examination (84) of California county inservice programs revealed a variety of such work products as the following: science exhibits; social studies skeleton units and directory of materials; music and art guide sheets, bulletins, festivals, and teacher aids. No appraisal of the value of these work products to meet teacher needs or to improve educational programs was reported.

Released Time and Use of Resources

Rehage and Denemark (92) observed four types of inservice programs in addition to those undertaken by local systems: area, state, regional, and national. In an area program in Michigan, for example, consultants were provided, but adequate time for teacher participation was not. The Illinois Curriculum Program provided both kinds of resources.

Physical Facilities and Instructional Materials

Few of the studies of physical facilities (a topic regularly discussed in the REVIEW issue devoted to "Administration") related directly to the curriculum. Belknap (16) used the 10 developmental tasks of children as a basis for planning the kindergarten room. His major observation was the need for flexibility of equipment and for varied use of space. Alexander (4), examining the ungraded school from the architect's point of view, stressed the importance of planning for flexibility and ease in dividing large groups.

Increasing attention was paid to design of classrooms for specific subject-matter areas. Bagby and Stickle (14) reported results of a survey on what is needed in an English classroom, and Carter (30) discussed facilities for music and drama. Ovard (88) surveyed planning of social studies facilities. Ireland (58) described a plan featuring workshops and "student action" rooms that permit students to develop particular interests or abilities. Brubaker and Perkins (24) advocated primary emphasis upon space designed to stimulate individual learning, discussing (a) "quest space" for individual study, (b) teacher studios, and (c) group spaces. LeCronier (71) described a school designed to fit a situation in which team-intern teaching was employed.

The writings reported here recognize that school-plant planning, as well as curriculum planning, must proceed from a carefully conceived idea of what the educational program ought to achieve. Once the purposes are clear, the physical facilities of the school must promote, rather than prescribe, the curriculum. Since purposes will undoubtedly change and since newer teaching methods will be devised, the keynote at present is flexibility.

Many suggestions were made for a center for instructional materials, and DeBernardis (37) proposed the following as the goals for use of such a center: It must (a) encourage teachers and pupils to use a variety of materials, (b) provide means for exchange of materials, (c) provide for effective storage and distribution, (d) provide inservice education facilities, (e) provide for production of materials, (f) provide inventory catalogs, (g) provide repair facilities, and (h) draw together related materials on any given topic. Carmony (29) believed that the library space can provide maximum preview and administrative service with minimum new-space requirements. Cypher (34) and Sattley (95), on the other hand, raised objections to the use of the school library as a general materials center.

Davidson (36), Hamilton (50), and Kosell (65) described methods of distribution of instructional materials. Evaluations of distribution techniques, however, are almost nonexistent in spite of the obvious relationship between distribution and utilization of materials.

Gillingham (45) tried to find a method of involving school personnel in the evaluation and selection of instructional materials. He approved the trend toward having the audio-visual staff advise committees of teachers who had major responsibility for evaluation and selection of audio-visual materials.

Preparation for Use of Instructional Materials

Benda (17) found that most teacher-training institutions have no established course of study in audio-visual instruction. Beginning teachers are thus without full awareness of the potential contributions of various

media. Such courses as were offered stressed operation of machinery rather than selection and proper utilization of materials. Camp (27) found a positive relationship between the teacher's use of audio-visual materials and his level of audio-visual training. These studies made clear that the presence of instructional materials does not ensure their intelligent use or, indeed, their use at all.

School Structure and Organization

Goodlad and Anderson (47) confirmed increasing use of the nongraded plan throughout the United States. Austin (12) gathered information on the nongraded primary unit, concerning its development, objectives, operations, professional staff, and public relations.

As the nongraded pattern found its way into new communities, variations in organization and structure developed, and individual plans were based on different emphases: continuous progression (39), division by reading levels (48), and provision for the gifted (91). Kluwe (63), investigating integration of the kindergarten and the primary programs, found that integration of the programs resulted in some statistically significant advantages to kindergarten children in better social adjustment and greater reading readiness.

Finley (40), working with a self-contained group of third-, fourth-, and fifth-grade children, found that, in this flexible grouping plan, the youngest benefited most in terms of academic achievement and that the growth of the older pupils was not impaired.

Hamilton and Rehwoldt (51, 93) reported on the multi-grade, multi-age plan in the Torrance Unified School District of California. This plan groups children varying three or four years in age and grade level at a primary level and at an intermediate level. A consistent pattern of gains greater than those of children in single-grade classes was observed in academic achievement, personal and social adjustment, and maturity and desirable behavior characteristics.

Bremer (23) found that first-grade reading-achievement scores were higher for high-readiness children who remained in regular heterogeneous classes than for high-readiness children who were segregated from low-readiness children. Martin (77), analyzing ability grouping in junior high schools, found little evidence that it materially benefited any of the segregated ability groups.

Morton (80) discussed successful heterogeneous grouping where homogeneous grouping is not feasible because of the size of the school. Wilhelms (111) described the flexible-open society that can exist where various grouping procedures are all used in the same single classroom. Crutcher and Smith (32) maintained that average-low, average-high grouping which avoids the disparity of most homogeneous plans provides for both successful academic learning and successful social learning.

Attention was given to the dual-progress plan, whereby the elementary student spends half days in graded classes of English and social studies, and half days in nongraded classes with specialized teachers. Pregler (90), Stoddard (102), and Wernick (109) reported such practices but gave no data regarding their results.

Concern for the gifted rekindled interest in reappraising grouping practices. In general, evaluations of pupil achievement in secondary schools and in specific subject areas tended to favor homogeneous rather than heterogeneous grouping. Gallant (44), Johnson and Shields (61), and Shapleigh (98) described grouping for the gifted at the high-school level, but made no evaluations. Hart (53), Smith (100), Wagner (107), and Wernick (109) reported improved accomplishment in reading, language arts, arithmetic, and science as a result of homogeneous grouping at the elementary-school level.

Gallagher (43), Hay (54), Lauchner and Horner (69), and Lawson (70) cautioned against accepting grouping uncritically and pointed out that homogeneous grouping for one subject area may actually extend the range of heterogeneity for another. Conclusions about grouping which have been reached on the basis of evaluation of one or two objectives may change when a broader range of objectives is considered—and physical rearrangements of pupils ought to be related to, or determined by, equally important rearrangements in curricular and instructional practices.

The literature described utilization of in-class enrichment practices for the gifted (1, 9); discussed academic segregation of the gifted (19, 52, 73, 91); and proposed programs of acceleration (56) and the utilization of the kinds of teaching procedures used in colleges (33). Many statewide (78) and city programs (28, 57) were in process of development. Bettelheim (20) observed, however, that the claims and counterclaims for segregated education are emotional rather than scientifically based.

Anderson (6) believed most gifted children need more than enrichment in regular classrooms, but Baldauf (15) showed that they make above-average gain when participating in enrichment programs. This suggests that the nature and quality of the enrichment program may be the important factor. Abramson (2) found that ability grouping for children of high ability had little or no effect on later academic achievement. Bettelheim (20) believed that removing gifted children from academic contact with others may create serious problems for them and for society. Mann (76), reporting greater acceptance and rejection among children within ability groups than across groups, found that children in heterogeneous groups showed greater range of friendships, both in and out of school. Goldworth (46), in a more limited study, found that segregation of the gifted in grades 4 through 8 had no effect on friendship patterns and group cohesion. Herminghaus (57) reported positive social effects for the segregation program. Crutcher and Smith (32), Wernick (109), and Yerg (112) reported similar results for average and slow-learning children.

Otto (87) pointed out that acceptance of individual differences forces concern for differentiated education and for changes in organization to deal with such differences. Most mechanical approaches to school and class organization deal with peripheral factors rather than with problems of instruction and necessary instructional resources. Thelen (106) believed grouping based on feelings, attitudes, ambitions, and relationships among children, plus appropriate instructional planning and teaching, far more likely to produce increased achievement than grouping designed for increased manageability of pupils or comfort of teachers.

The literature on the effects of grouping on the gifted was reviewed in a previous issue of the REVIEW (41).

Staff Utilization

During the period under review, the *Education Index* first employed the term "staff utilization" as a heading for classifying the rapidly increasing literature dealing with teaching teams and other experimental patterns of organizing the instructional staff. In two extensive surveys, the Commission on the Experimental Study of the Utilization of the Staff of the Secondary School (82, 83) brought together accounts, descriptions, and progress reports of a variety of studies. Although results of almost all were incomplete, there was an observable tendency for many to limit the scope of their inquiries to seeking ways to use nonprofessional personnel, audio-visual aids, modified schedules, and varying sizes of classes in order to free the time of teachers from noninstructional responsibilities or to make experienced teachers with special skills available to larger numbers of students. So far, attention has been centered on the administrative and mechanical aspects of staff reorganization and has not dealt with corollary matters of curriculum change.

Illustrative of promising staff utilization studies, a Texas project (83) sought to test the hypothesis that the teaching of large groups (using television, radio, tape recorders, and over-viewers) and teacher-pupil planning of learning experiences for individual and small-group effort in unit-type activities are more economical and more educationally productive than secondary-school teaching after the traditional pattern. In Weber County, Utah (82, 83), a curriculum of the core type was proposed as a more economical utilization of staff than the traditional type. An attempt to develop an instructional program suited to a uniquely designed high-school plant in Syosset, New York (82, 83), evolved five patterns of staff organization: (a) alternating teaching, (b) co-teaching, (c) master-teaching, (d) panel teaching, and (e) team teaching.

Unfortunately most of these programs have not progressed far enough for conclusions to be reached regarding the value of the several innovations. Even more unfortunate is the fact that many of them are but demonstrations of practice, lacking any design for evaluation. It is regrettable

that more effort is not made (a) to explore possibilities of curriculum organization and their relation to appropriate patterns of staff organization for implementation and (b) to extract maximum information and understanding from a staff utilization study by evaluation of important independent-dependent-variable relationships.

Core Organization

Noall and Winget (86) reported on core organization in Utah. Schwartz (97) observed that high-school students who participated in a core program in junior high school achieved higher final marks in grades 10, 11, and 12 than those who did not so participate. Mennes (79) found that students in double-period classes combining English and history made greater progress than students in separate single-period classes. (Additional references on core programs were cited in the REVIEW issue devoted to "Adolescence.")

Class Size

The study of class size and its effect upon achievement continued a popular theme. Johnson, Lobb, and Patterson (62) compared achievements of the following: (a) 20 students taught by one teacher and 35 taught by one teacher; (b) 70 students taught by two teachers as a team and 70 taught by two teachers in two classes of equal size; (c) 70 students taught by two teachers as a team and 20 taught by one teacher; and (d) 70 taught by two certified teachers as a team and 70 taught by one certified and one noncertified teacher as a team. No significant academic variance between and/or within the experimental classes of varying size was found.

Cammarosano and Santopolo (25) found that a college class of 60, assuming comparable teaching, equaled the achievement of a class of 30. Nelson (85), measuring the achievement of college students in elementary economics, found that, under identical conditions, classes of 85-140 can be taught as effectively as classes of 16-20.

Macomber and Siegel (74) found that instruction given simultaneously to large groups in either television sections or large classes is accomplished at some sacrifice of students' favorability to the course, even though there is virtually no measurable decline of achievement. Schellenberg (96) found a consistent inverse relationship between group size and student satisfaction; that instructors are more inclined than students to show satisfaction with large groups; and some evidence of slightly higher academic achievement in small groups than in large groups.

Nachman and Opochinsky (81) sought to discover why class size has been found repeatedly to produce no significant effect on the amount

learned. Their study tested the hypothesis that two groups taught under different procedures may learn different amounts in class but that, when both engage in significant extra study, the difference in performance on the final examination becomes negligible. Although this experiment was not primarily concerned with the effects of small versus large classes, the data indicated that students in small classes learned significantly more in class than did the students in large classes. The hypothesis that no difference would be found between the classes when the students were given an opportunity to study for an examination was also confirmed.

Summary

This review of the literature in administrative structure and processes in curriculum development reveals that:

1. The principal is expected to assume a leadership role in improving and developing the curriculum. The importance of his working style (democratic and co-operative), his capacity to enhance the leadership function of the staff in instructional improvement, his ability to do curriculum research, his skill in problem definition and problem-solving, his skill in evaluation processes, and his general ability to understand and work with people were all emphasized.

2. A wide array of working processes and problem areas has been utilized in programs of inservice education of teachers. The results of such studies indicate that attempts to deal experimentally with an aspect of the educational program, if carried on with enthusiasm and persistence, will be regarded by the participants as valuable and will produce an effect greater than that produced by the usual program of activities. In general, however, studies of problems closely related to significant areas of the educational program and its educational and social processes seem to be more effective than those less related. This suggests that sufficient knowledge has been gained to permit development of a tentative theoretical structure of staff work on curriculum problems, which would enable the systematic accumulation of further knowledge.

3. There is a significant attempt to relate improvements in physical facilities to concepts of educational organization and program. This effort is evidenced in building design, arrangements within educational units, and variation in classroom design to match the intended function. It may even be a fact that ingenuity in building and classroom planning has outstripped ingenuity in educational planning.

4. Attempts are being made to dispose large numbers of children, staff, and facilities in more economical and efficient ways to deal with large numbers of students, with variation in ability, and with limitations of teacher competency. Under the stimulus of foundation effort and public criticism, more activity is being evidenced in this area than at any other

time during many years. No clear trend has yet appeared in the studies under way.

This review of studies of administrative structure and its processes and of their findings brings four important research problems into focus:

1. Staff and administrative structure which actually exists in a school program is more complex in nature and function than is implied in the common conception of a principal and teachers operating more or less independently. There is need, therefore, to study staff and administration structures as social systems which involve principals, supervisors, teachers, children, and parents, and which operate as units within a larger system. Study of the roles of a principal without relation to other roles in the same structure, therefore, will only lead to the finding that the principal must be all-wise, responsible for all things, and competent to deal with all problems.

2. Administrative structures appropriate for budgeting, pupil accounting, building maintenance, determination of lines of authority, and the like may not be appropriate for improving the curriculum; yet, there is little recognition of the implications of a difference in structure for a principal when he moves from his role in the administrative structure to his leadership role in curriculum improvement.

3. The relationship among three classes of variables tends not to be recognized in studies of structure and processes in curriculum development—the variables having to do with variations in the behavior of staff personnel and changes in administrative structure; the variables having to do with changes in values, abilities, and understandings of the instructional personnel, and changes in the curriculum structure; and the variables related to the educational behavior of children and youth.

It seems obvious that all three of these classes of variables need to be related. Changes in administrative structure ought to be related to changes in teacher behavior, which ought in turn to be related to changes in the behavior of the learner. Perhaps the best we can do at present is to observe the relationship among variables in one or two classes, that is, how changes in the working style of the principal are related to staff acceptance of his leadership.

4. Those doing research on administrative processes in relation to curriculum structures lack a methodology adequate for dealing with the complexities of this problem. Unfortunately, few studies reviewed here fully utilize present knowledge.

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Index to Volume XXX, No. 3

Page citations are made to single pages; these are often the beginning of a chapter, section, or running discussion dealing with the topic.

Ability grouping: and academic achievement, 265
Acceleration: programs of, 265
Accreditation data: need for standardization of, 239
Achievement in core curriculum: academic and social, 234
Action research: curriculum project, evaluation of, 232; reports on, 239
Adjustment: teacher criterion of, 248
Administrative procedures: degree of diffusion of, 212
Administrative structure: and curriculum development, 258, 269
Administrator: role of, in curriculum development, 258
Adolescent peer groups: increasing influence of, 207
Adolescents: influence on, by peers and adults, 215
Advanced Placement Examination Program: description of, 234
Affective behavior: relation to intelligence, 192
American Legion: textbook analysis and criticism and citizenship education, 201
Anxiety: over grades, relation to teaching method, 251; reduction of, in teaching, 252
Arithmetic: comparison of European and American children in, 203
Articulation: of English curriculum, 235
Athletics, interscholastic: and scholastic attainment, 216
Attitudes: change of, by education, 217
Audio-visual instruction: course of study in, 263
Authoritarian teaching: effect of, 251; vs. democratic, 249
Automatic teaching: research on, 252

Biological sciences: new curriculums in, 228, 236
Block plan of school organization: evaluation of, 232
Block-scheduling, junior high: description of, 235
"Brainwashing": studies of, 217

Case study: of school in industrial city, 232
Centers of higher education: establishment of, 237
Child-guidance clinics: development of, 208
Child-study programs: effect on teachers' ways of working with children, 261; in inservice programs, 261
Citizen co-operation: in curriculum development, 261
Citizen groups: use to recommend school policy, 202
Citizens advisory committees: discussion of, 232
Citizenship education: and American Legion, 201
Class size: and effect on achievement, 267; research on, 250; variance in, and effect on curriculum, 234
Classrooms, design of: for specific subject-matter areas, 263
College admission: of borderline students, 240
College or university courses: as inservice training, 260
Communication: as key in teacher-student relationships, 253
Comprehensive high school: discussion of, 233
Computation: comparison of English and American students on, 204
Conformity: effect of discipline on, 248
Consultants, use of: in inservice education, 261
Content of education: determination of, 188
Coordinated Education Center: discussion of, 229
Core curriculum: in junior high school, description of, 235, study of, 234; use of, 266, 267
Counseling: youths' desires in, 208
Creativity: nature of, 218
Critical thinking: effect of large-group instruction on, 250; in junior high-school English curriculum, 235
Cultural transmission: through teaching, 253
Culture, student: study of, 215
Curriculum: components of, 226; definition of, 185; effect of social and psychological research on, 214; forces influencing, 199; influence of changes in family life on, 209; influence of changes in group life on, 211; influence of value changes on, 209; national, discussion of, 229, proposal for, 190; organization of, 240; scientists' influence on, 205; secondary, discussion of studies, 233; state of the field, 185; teacher involvement in planning, 192

Curriculum decision-making: at the societal level, 186; institutional-instructional levels of, 189
Curriculum development: administrative structure and processes in, 258; and in-service education, 259
Curriculum organization: patterns of, 231
Curriculum study programs: relation between teacher satisfaction with, and method used to develop, 193

Delinquency: increases in, 207, 208
Democratic teaching: effect of, 251; vs. authoritarian, 249
Democratically acting principals: and readiness for curriculum change, 259
Demonstration lesson: as inservice training, 260
Depersonalization: general social trends toward, 209
Desegregation: pressures on curriculum, 201
Developmental tasks: as basis for planning kindergarten room, 262
Dewey centennial: publications during, 187
Directions: effect of clarity of, on discipline, 248
Discipline: dimensions of, 248
Discovery activities: direction of, and effectiveness of learning, 250
Discovery method of teaching: studies of, 250
Discussion methods: comparison with other teaching methods, 250
Drama: facilities for, 263
Dual-progress plan: description of, 265

Economic education: scope and sequence charts in, 262
Economic philosophy: application to problems of the scientific age, 206
Educational philosophy, city-wide: statements, 262
Ego defenses: relation to attitudes, 217
Elementary education: curriculum decisions in, 230
Elementary school: nongraded, discussion of, 231; perception of, by public, 231
Elementary-school teachers: training in liberal arts, 239
English, classroom for teaching: needs of, 263
English curriculum: high-school, changes in, 235; in core classes, 235
Enrichment, in-class: utilization of, 265
European and American children: comparison in arithmetic, 203
Evaluation of education: pre and post Sputnik, 203
Example-setting: effects of, 248
Expenditure per pupil: and quality of education, 212

Family interaction patterns: and mental illness, 217
Family life, changes in: influence on curriculum, 209
Family-life courses: usefulness of, 210
Federal aid to education: history of struggle over, 200
Foreign educational practices: impact on American education, 202
Foundations, philanthropic: activities of, 226

General education: at high-school level, 235; college undergraduate programs of, 237
Geography curriculum: description of, 237; new approaches to, 193
Gifted: provision for, 261, 265
Grade, average student: relation to teacher-pupil rapport, 249
Grades: effect of anxiety over, 251; effect of removal of, 231; relation to student status and roles, 215
Group life: influence of changes in, on curriculum, 211
Group psychotherapy: use of, 252
Grouping: effects of flexible plan, 264; heterogeneous vs. homogeneous, 264

Heterogeneous vs. homogeneous grouping: effects of, 264
Higher education: curriculum decisions in, 237
History of science: teaching of, to understand the scientific age, 206

Imagination: nature of, 218
Inservice education: and curriculum development, 259; discussion of, 268; problem areas for study, effects of, 261; techniques of, 259
Instruction: of large groups, 250
Instructional materials: equitable staff use of, 259; evaluation and selection of, 263; methods of distribution of, 263; preparation for use of, 263
Instructional materials center: suggestions for, 263
Instructional procedures: research on, 246
Intercultural patterns: curriculum and instructional implications of, 201
Internships: fifth-year programs, 238
Iowa Tests of Basic Skills: Use to compare Dutch and American children, 204

Kindergarten: advantages of, 264
Kindergarten room: developmental tasks as a basis for planning, 262
Kindergarten-primary program, integrated: experimentation with, 231

Large schools: advantages and disadvantages of, 212

Large-group teaching: discussion of, [illegible]; in Newton Plan, [illegible]; new pattern of, 266
Lay cooperation: in curriculum development, [illegible]
Leadership: in curriculum development, [illegible]
Learning: and behavioral goals, 218; effect of direction in, [illegible]
Learning, theory of: implications for teaching machines, [illegible]
Lecture method of teaching: vs. project method, 249
Liberal arts: for teachers, 238; in teacher education, 239
Liberal arts curriculum: for technical and professional students, 237
Liberal arts subject matter: strengthening in programs, 237
Literature, world: in junior high school curriculum, 235
Local control: of curriculum, 190; of education, 240
Logic: and views of teaching, 252
Low-ability students: effect of a large class on, 250

Marriages, teen-age: studies of, 209
Mass media: and automatic teaching, 213
Mathematics: improvement of instruction in, 205; new curriculums in, 227, 236
Medical curriculum, new: report on, 239
Mental health: and the school program, 210; curriculum materials for teaching, 211
"Methods courses": near-obliteration of, 238; timing of, 239
Minnesota Multiphasic Personality Inventory: relation to other variables, 249
Minnesota Teacher Attitude Inventory: relation to other variables, 249; use with student teachers, 239
Misbehavior: causes of, 248; relation to punishment used, 248
Mobility: effects on school turnover, 209
Monteith College: program of 238
Mothers' employment: effects on children, 210
Motivation: discussion of, 218; of student, and teaching methods, 250, by teacher comments on tests, 248; questioned as explanatory construct, 218
Multi-age plan: use of, 264
Multi-grade plan: experimentation with, 231; use of, 264
Music: facilities for, 263

National curriculum: discussion of, 229
Nongraded elementary-school plan: discussion of, 231; use of, 264
Nursing education: refinement of programs in, 239

[illegible]

Parent-teacher-pupil conference: evaluation of, [illegible]
Peer ratings: of social characteristics and teacher-pupil rapport, 249
Perception of student behavior: teacher's accuracy of, and teacher's effectiveness, 248
Physical facilities: and the curriculum, [illegible]; relation to educational program, 268
Physical sciences: new curriculums in, [illegible], 236
Physics: improvement of instruction in, [illegible]
Physiology: as part of biological sciences curriculums, [illegible]
Political and educational philosophy, Soviet: ideological sources of, [illegible]
Prediction: of teaching success, 247
Pressure groups: effect on curriculum, 200
Principal: role of, in curriculum development, 258, 268
Problem-solving arithmetic: comparison of English and American students, [illegible]
Project-centered teaching: vs. lecture method, 249
Psychiatry: application to problems of the scientific age, 206
Psychoanalytic theory: relation to teaching, 252
Public opinion: survey of, regarding school's tasks, 231
Pupil-teacher load: in Dutch schools vs. American, 204
Purposes of education: determination of, 188

Rapport: relation to personality indices, 249
Reading instruction, developmental: in junior high school, 235
Reading levels: grouping by, use of, 264
Role, superintendent's: perception by self and others, 191
Role, teacher's: discussion of, 253
Role-taking processes: of teacher, 248

School library: as a general materials center, 263
School organization: research in, 212

School sizes: and quality of education, 212
School structure and organization: and curriculum, 264
Science: place of, in curriculum, 205
Science programs, current: evaluation of, 236
Scientists: influence on curriculum, 205
Secondary education: curriculum decisions in, 233
Secondary-school teachers: training in liberal arts, 239
Self, concern for: by teachers, 249
Semantic differential: relation to teacher's verbal behavior, 249
Slum living: impact upon children, 232
Small schools: advantages and disadvantages of, 212
Social climate: effect of, 216
Social objectives of education: criticism of, by scientists, 205
Social perception: of children, 230
Social problem-solving behavior: investigation of, 192
Social psychology: application to teaching, 250
Social studies: controversial issues in, 202; curriculum in core classes, 235; new curriculums in, 228; planning of teaching facilities for, 263; units of study, effectiveness of, 251
Social system: school as, study of, 215
Social-science general education: curriculum in, 194
Socioeconomic class: and attitudes toward desegregation, 200; and child-rearing studies, 214; relation to other variables in school, 214
Sociology: application to problems of the scientific age, 206; effect of research in, on curriculum, 214
Sociometric pattern: of ability groups, 265
Sociometric status: relation to intelligence, 248
Soviet political and educational philosophy: ideological sources of, 203
Staff utilization: discussion of, 266
Student teaching: planned experiences prior to, 239
Student-centered teaching: vs. teacher-centered, 249
Study of Values: relation of teacher's verbal behavior to, 248
Styles of teaching: research on, 249
Subversive activities, investigation of: and voluntary censorship by teachers, 201
Superintendent: role expectations of major reference groups, 191; role perception by self and others, 191
Supervisor, curriculum: responsibilities of, 259
Supervisory roles: in curriculum development, 258

Teacher: functions of, 252; role of, and student-teacher relationship, 249, in in-service training program development, 261
Teacher aids: and curriculum, 234
Teacher comments: effect of, on tests, 248
Teacher education: guidelines for, 202
Teacher effectiveness: criteria of, 247
Teacher effectiveness ratings: relation to class size, 250
Teacher involvement in curriculum planning, 192
Teacher-centered teaching: vs. student-centered, 249
Teacher-pupil rapport: and grade averages, 249; of first-year teachers, prediction of, 249; relation to personality indices, 249
Teacher-pupil relationships: research on, 246, 247
Teachers colleges: comparison with liberal arts colleges, of liberal arts training, 239
Teachers' handbooks: preparation of, 262
Teacher's knowledge: of causes of pupil misbehavior, 248
Teaching: assessment of, 253; concepts of, 251; conceptual structure for, 247; definition of, 217, 253; effectiveness of, 247; logic of, 191; logical structure of, 253; principles of, from principles of learning, 252; psychotherapeutic view of, 252; research on, 246; successful, prediction of, 247; theoretical structure of, 248
Teaching machines: discussion of, 252; effect of, 214
Teaching methods: eclectic, superiority of, 217; nontraditional, discussion of, 238
Teaching teams: use of, 238
Team-intern teaching: school appropriately designed for, 263
Technological forces: effect on curriculum, 202
Televiewing, excessive: and behavioral concomitants of, 213
Television: credit courses, offerings in, 213; influence of, on social studies, 231; instruction, and class size, 267, effectiveness of, 213
Tests: effects of teacher comments on, 248
Tests of Basic Skills: use to compare Dutch and American children, 204
Theory of knowledge: and views of teaching, 252

Therapeutic communities: discussion of, 211
Therapy: relationship to teaching, 252
Transfer of training: relation to learning method used, 250
Trustees, college: and curriculum decisions, 194; and curriculum improvement, 240
Turnover, school: correlates of, 209

Ungraded school: examination of, from viewpoint of architect, 262; use of, 231, 264
Unit concept, social studies teaching: effectiveness of, 251

Values: effects of, on curriculum, 209; student, changing of, in schools, 215, relation to achievement and teacher's value pattern, 248; variations within social class, 214
Verbal behavior of teacher: influenced by his value patterns, 248

Women, changing role of: in work world, 210
Workshop: as preferred method of in-service education, 260

Youth, alienation from general culture: impact on education, 207

REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association. Contents are listed in the Education Index.

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Volume XXX, No. 3 **June 1960**

Curriculum Planning and Development

Reviews the literature for the three-year period since the issuance of Vol. XXVII, No. 3, June 1957.

TABLE OF CONTENTS

Chapter *Page*

Introduction 184

I. Curriculum: The State of the Field 185
JOHN I. GOODLAD, *University of Chicago, Chicago, Illinois*

II. Forces Influencing Curriculum 199
ALICE BRESLOW, *San Francisco State College, San Francisco, California*
JEROME DISQUE, *San Francisco State College, San Francisco, California*
GUNNAR SAUSJORD, *San Francisco State College, San Francisco, California*
ROBERT SMITH, *San Francisco State College, San Francisco, California*
STANLEY SOLES, *San Francisco State College, San Francisco, California*
FRED WILHELMS, *San Francisco State College, San Francisco, California*
METTA ZAHORSKY, *San Francisco State College, San Francisco, California*

III. Components of the Curriculum 226
OLE SAND, *Wayne State University, Detroit, Michigan*
DON DAVIS, *Wayne State University, Detroit, Michigan*
ROSE LAMMEL, *Wayne State University, Detroit, Michigan*
THOMAS STONE, *Wayne State University, Detroit, Michigan*

IV. Teaching 246
ARNO A. BELLACK, *Teachers College, Columbia University, New York, New York*
DWAYNE HUEBNER, *Teachers College, Columbia University, New York, New York*

Page

V. Administrative Structure and Processes in Curriculum Development 258
VIRGIL E. HERRICK, *University of Wisconsin, Madison, Wisconsin*

Index 275

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EDUCATIONAL PRESS ASSOCIATION OF AMERICA

INTRODUCTION

THIS issue of the REVIEW reports research and selected speculative, theoretical, and analytical papers pertaining to curriculum which have appeared since the June 1957 issue (Volume XXVII, No. 3) entitled "Curriculum Planning and Development." A few references are to prior publications, for comparative purposes and because some studies cited here depend on previous research or theoretical formulations.

Major problems encountered were similar to those which have confronted previous Committees. It is difficult to separate curriculum practice and curriculum as a field of study from education as a whole. It is both difficult to isolate curriculum studies and misleading to define the field by reporting research when curriculum as yet is so little guided by research. The Committee made an earnest effort, therefore, to organize its efforts around a framework that might be useful for both viewing the field and conducting research in the future.

What constitutes curriculum and how the definition determined organization of this issue is discussed in the first section of Chapter I. The design of the issue will thus be best understood by reading it consecutively.

JOHN I. GOODLAD, *Chairman*
Committee on Curriculum:
Organization, Planning, and Teaching

CHAPTER I

Curriculum: The State of the Field

JOHN I. GOODLAD *

Scope of the Curriculum Field

REVIEW OF research on curriculum planning and development first necessitates agreement on what concepts, data, and processes are involved in an inquiry in the field of curriculum. The reader will not, however, discover a single explicit definition of curriculum in this issue of the REVIEW. Prevailing definitions approximate those summarized in the June 1957 issue (3): (a) The curriculum is a design or plan of institutionalized education. (b) The curriculum consists of the actual learning opportunities provided at a given time and place. (c) The curriculum is an instrument for bringing about psychological changes in learners as a result of their activities in an educational institution. Though the second definition is more commonly stated as ". . . all the educational experiences that a learner has under the guidance of the school" (24), the term "learning opportunities" is substituted here for the term "educational experiences"; since an "experience" usually is defined as the result of an interactive process, such substitution is necessary if the distinction between definitions (b) and (c) is to be a real one.

Distinctions among these and other definitions of curriculum appear not to affect significantly the kinds of questions and problems dealt with in common by those who work in the field of curriculum. As Kearney and Cook (24) point out, even those who define curriculum as "something that happens to learners" devote their attention to problems involved in developing a curriculum plan or design.

The following statements have been agreed upon by the Committee responsible for preparing this issue of the REVIEW OF EDUCATIONAL RESEARCH and have been used in reviewing the literature and summarizing findings:

1. Curriculum planning takes place in a social context and involves translating views of the nature of man and the universe into educational aims. Actual conditions—war and peace, work and leisure, wealth and poverty, education and "miseducation"—influence curriculum decision-making. Knowledge about learning and the educative process must be taken into account. Governmental, professional, and lay forces mold educational policy. The social context includes highly complex political structures through which pertinent data may, or may not, be applied in arriving at curriculum decisions (Chapter II).

* With the assistance of Margaret P. Ammons, the University of Chicago.

2. The field poses certain questions to be answered for all types of education. Ends must be determined, and means to these ends must be considered. Methods of organization and evaluation must be developed. Answers to these questions—and the lack of answers—determine the character of a curriculum (Chapter III).

3. Teachers' decisions reflect their interpretations of all curriculum decisions made up to the point at which teachers and learners engage in the learning-teaching process. Their decisions involve dealing concurrently with realities within the classroom and with a variety of factors and forces from outside the classroom, and these decisions are heavily weighted by their own values. Learners react to various stimuli according to their perceptions of these stimuli (Chapter IV).

4. Curriculum development is implemented through administrative, supervisory, and organizational arrangements. Responsibility is delegated to professional people to create a setting for curriculum development and improvement. The function of these people is to provide leadership, to see to it that certain facilities and materials are available, and to create a framework within which instruction proceeds (Chapter V).

This first chapter deals with many of the same questions, but in different ways. It emphasizes curriculum as a field of inquiry and attempts a classification of problems and questions according to nearness to, or remoteness from, acts involved in the learning-teaching process. At the societal level are various analyses, pronouncements, and reports, conceived broadly, or concerned with some type of education—general, vocational, and professional, elementary, secondary, higher, or adult. At the institutional and instructional levels are proposals and programs pertaining to specific, identifiable institutions or groups of learners, and to the actual performance of teachers.

This chapter draws primarily upon analytical and theoretical formulations, using selected research studies only to illustrate kinds of studies and data that can be pertinent. (What one chooses to call data depends upon the theory one constructs to explain phenomena.) Questions are raised in each section which may prove useful in the guidance of future research—questions about who should make what decisions, about appropriate sources of data for decision-making, and about how curriculum decisions are made.

The Societal Level and Curriculum Decision-Making

In all periods in history there have been practical and theoretical proposals for educational reform. It is virtually impossible either to identify the impact of long-standing philosophical formulations during any brief period, or to single out and predict the impact of fresh statements appearing during such a period. For example, how much and in what ways did John

Dewey influence curriculum during the period under review? Do John Dewey centennial was celebrated in 1959 with a host of publications concerning the philosopher and his work (for example, 4, 5, 16). Are critics now elsewhere being redesigned to correct what Snow (44) referred to as a long-standing and widening schism between two intellectual cultures, the literary artists and the scientists? He argued that, in today's world, standards of scientific literacy must be placed on importance scale by side with standards of the traditional "literate" culture.

The last three years furnished a decade of unusual interest in, and debate over, education in the United States. Evaluations of U. S. education in the literature between 1950 and 1958 became more negative toward the end of this period (29), apparently as a result of the launching of the first Soviet satellite. Whyte (49) asserted that the school must become what Riesman (39) terms "counter-cultural," thus wage its weight against powerful socializing forces that shape "the organization man." With Commager (7), he maintained that the socialization of individuals is now being effected by other institutions and forces, and that the schools must place more emphasis on contributing significantly to the individual's intellectual development. Rickover (34) looked at world affairs, manpower resources, national crises, comparative education philosophy, psychology, community organization, teacher qualifications and certification, and curriculum and instruction in formulating a list of prescriptions for U. S. schools. Conant (8) endorsed the comprehensive high school that Rickover condemned.

It requires some stretching of both language and imagination to classify such material as curriculum research. The several authors do not hold positions in federal or state political structures concerned with or locally controlling, public education, nor are they in positions involving responsibility for planning specific curriculums. Nevertheless there is often a parallel between influential lay opinion of what curriculum ought to be and what happens within educational institutions. For example, within months after release of Conant's report high schools in various parts of the country announced new graduation requirements closely coinciding with his recommendations. Rickover considered Dewey's influence so far from dead that he found it necessary to condemn him repeatedly. Dethrick, justifying his 1961 budget request before the House Committee on Appropriations (32), was called upon to defend the U. S. educational system against the charges earlier delivered by Rickover before the same Committee. Rickover's appearance on NBC's "Meet the Press" brought the largest audience response in the 14-year history of the program, almost unanimously praising Rickover (32). It would be interesting to know what curriculum changes, if any, have taken place in the schools of Park Forest, Illinois, which Whyte singled out as providing an example of what schools ought not do; and how much Stoddard (45) was influenced—even indirectly—by Snow's lecture in formulating part of the theory underlying certain curricular and organizational innovations in selected elementary

schools involved in a project with New York University where Stoddard is dean; the resemblance in their theoretical base is striking.

Certainly, people with direct responsibility for education mold curriculums according to some conception of what education ought to be. In many countries—and particularly in the developing countries of Africa, Asia, and South America—political and educational leaders view education as essential to the advancement of whole peoples. In an awe-inspiring revolution of the human spirit, illiterate parents see schooling as essential to the future welfare of their offspring; educational effort is focused upon the establishment of primary schools and upon keeping pupils in them long enough to become functionally literate (48). In the United States, with total literacy close to an established fact, but with national and individual survival thought to be heavily dependent upon science and technology, there is increasing emphasis upon science and mathematics (48).

The fact that curriculum decisions should, and inevitably do, reflect some human conception of what ought to be—frequently somebody's perception of someone else's conception of what ought to be—raises profound questions for curriculum theorists and researchers, answers to which have far-reaching implications for all citizens. Each question must be examined with a view to determining methods and sources of data appropriate to its solution. The question, for example, of who should determine the purposes and content of the educational program in the United States involves moral and legal issues, as Smith, Stanley, and Shores (43) so well point out. Questions of how to determine the best educational ends, of what they are, and of how to implement them, quickly acquire philosophical, political, strategic, and psychological considerations. Woodring (51) looked to the great philosopher (not necessarily the professional) to enunciate core values of the American people so clearly that the tasks of the school would become clear. He had little to say about procedures through which such values might be translated into educational programs. Lieberman (25), on the contrary, brushed aside philosophical issues and focused on the political machinery through which a powerful teaching profession might exert effective pressure in educational decision-making, presumably to achieve improved educational practices.

It is astonishing that curriculum research has dealt so sparingly with the questions of what is expected of educational institutions and how curriculum decisions are made. It is said over and over that the schools belong to "the people" and that "the people" determine the objectives of their schools. What do "the people" want? Downey (11), Seager (39), and Slagle (41) built a conceptual model of mutually exclusive unit-functions to define the tasks of elementary and secondary education. From this model, they derived an instrument for assaying the perceptions of educational objectives held by various sub-publics. They sampled 1286 past and present educators and 2544 noneducators in 15 communities—a residential suburb, an industrial center, and a rural center in each of five regions, the West, the Midwest, the East, the South, and Canada. Downey's

study identified the three R's—"the skills for acquiring and communicating knowledge"—and cultivation of a "love for knowledge" to be the first and second priorities for both elementary and secondary education among all these sub-publics in all regions. Seager and Slagle found that these two priorities persisted when the educator group was separated from the non-educator group, and when occupation and age sub publics were compared. Interesting variations from group to group and on the basis of differing levels of education were noted on items farther down the scale of priorities. Slagle found occupational classification to be more productive than income, age, or sex grouping in indicating differences of opinion regarding the task of the school.

To what extent do the people want what Commager, Conant, Dewey, Rickover, or some other "success figure" wants? Does the people's perception of what Conant and Rickover want coincide with what these men really want? Where and in what way should and do professional educators, subject specialists, foundations, and other groups enter into the decision-making process at the societal level?

To what extent and in what ways is the kind of education the people want actually implemented in curriculum decision-making? And, back to the question of authority and responsibility raised earlier, to what extent and in what ways *ought* the people's want to be implemented?

Empirical research won't answer the "ought" questions. But, until "ought" questions are separated from "what" questions and cast into conceptual constructs from which explanatory hypotheses can be derived and tested, the kind of research needed to explain curricular phenomena and to guide the curriculum worker in his inevitable decisions of "how" and "when" will not be forthcoming.

Institutional-Instructional Levels and Curriculum Decision-Making

As Chapter IV is devoted to curriculum planning and development at the instructional level, this section deals primarily with decisions and decision-making processes involved in planning and developing curriculums for various types of institutions.

Curriculum decision-making at the institutional level pertains to a specific educational institution or group of institutions having identifiable students, teachers, patrons, service areas, and sanctioning bodies. There appears to be considerable agreement among curriculum theorists regarding the major tasks of curriculum planning and development encountered at this level (17, 43, 47): determination of objectives; identification of the kinds and range of learning opportunities pertinent to these objectives; selection of designs or patterns through which these opportunities may be most effectively provided; and development of procedures for evaluating, changing, and improving the curriculum.

Educational proposals and decisions at the societal level become one of several sources of data to be considered in decision-making at the institutional level. As Lieberman (25) pointed out, however, it is naive to believe that local school boards actually control all the decisions about the curriculums and about other matters pertaining to their schools. Campbell (6) termed this belief "folklore," citing state and federal supreme court decisions to document his statement that the public schools have always operated within the framework established by the states and that federal influences have always been prevalent. He went on to observe: "Actually, current realities may be more in keeping with what our public policy for education ought to be than the prevailing fantasy is."

The question of who should make what decisions is as complex at the institutional as at the societal level. Hanna's (21) proposal for a national curriculum stirred much debate. Key questions regarding such a proposal are: "What curricular questions at what levels of generality and specificity can best be answered at the national level?" and "How are the answers to be used as data-sources for decisions appropriately left to the local level?" Conant (8) pointed to the uselessness of only one year of foreign language in high school; nonetheless, uninformed local decisions frequently condone such practice.

How institutional curriculum decisions are influenced and made is a provocative question for research. Certainly, the official pronouncements of boards of education or trustees responsible for specific institutions constitute inescapable sources of data for the professional. What views do board members hold? What views of what groups shape the decision-making processes of individual board members? Is there a relationship between values and or educational viewpoint of certain groups and curricular practices at a given time in a given place? McPhee's (28) study of the relationship between individual values, educational viewpoint, and local school approval provided a basis for needed research. If the phrase "identifiable curriculum practice" is substituted for "local school approval," it becomes apparent that McPhee's model can throw light on the kinds of questions raised. Preliminary research into community power structure as it affects local school policy would give some needed indications of the most productive groups to sample.

In one sense, a rational set of goals for an educational institution would be those agreed upon by the sanctioning body (community), faithfully transmitted through the agency of that body (board) to the professional leader (superintendent), and accurately translated by the professional group (teachers) into specific educational objectives. The superintendent (or other top-level executive) is a cultural hybrid linking confused and confusing cultural expectations from without and professional decision-making processes within.* Hencley's (22) study, however, causes one

*For clarification of this concept, the writer is indebted to Alicja Iwanska, "The Role of the Curriculum Maker in Cross-Cultural Perspective" (unpublished paper).

seriously to question the rationality in the process at the vital point of this task. He examined superintendents' perceptions and expectations held by school superintendents and their major reference groups with regard to the superintendent's role. The sample consisted of superintendents, members of the boards of education, and selected teachers, principals, and members of the PTA councils in 15 cities of Indiana, Illinois, and Wisconsin. Hencley found conflict between the superintendents' beliefs regarding their role and their perceptions of the expectations of these other reference groups regarding their roles. Superintendents' perceptions of the beliefs of others and the actual beliefs of others also conflicted, but the actual beliefs of superintendents and of the several reference groups did not significantly differ. His data suggest that superintendents experience significant difficulty in assessing accurately the true expectations of others. The effectiveness of superintendents as interpreters of what various groups want for their schools must be questioned. Curriculum literature emphasizing rational, intellectual processes of transmitting societal concerns into institutional curriculums, largely ignores certain operational facts of life.

The professional educator seeks to make formulations of educational objectives useful, whatever their derivations may be. The authors of Chapter III state that educational objectives, to be of maximum usefulness, should indicate both the kinds of behavior desired in the learner and the range of content or subject matter to be dealt with. They identify a present trend toward emphasis on defining content, citing a series of large-scale demonstration projects in mathematics, languages, and the physical and biological sciences that are now influencing the secondary school curriculum. Such a trend, if not carried too far, might balance the trend, which has been developing slowly over the last 40 years, toward emphasis on the behavioral aspect of education (17, 47). Interest in the behavioral considerations recently found expression through a taxonomical analysis by a group of college examiners (41). A study at the secondary school level (13) supplemented an earlier study at the elementary-school level (23); both emphasized learner behavior. All three studies are being used to guide test preparation and evaluation procedures.

Discussion of educational objectives up to this point has implied emphasis on teacher clarification of desired learner behavior. Such an emphasis could readily lead to the conclusion that appropriate teacher behavior is best derived from improved insight into learning and, subsequently, into how learning is best induced. Smith and others (42), while not denying the possibility of deriving a theory of teaching from a theory of learning, were not impressed by past progress toward this end. Teaching is one thing and learning quite another, they maintained. Smith and his research team, exploring the logic of teaching as exhibited in classroom discourse (2), broke such discourse into pedagogically significant units, which they then classified as logical operations. Their conclusion: there are logical operations in teaching, some more prevalent than others, notably

those of describing, designating, and explaining, in that order. Smith and his colleagues further noted a variation in frequency of these logical operations with a variation of subject matter.

As is so often the case with new and promising approaches, the surprising simplicity and straightforwardness of Smith's approach cause one to wonder why it was not exploited long ago. Smith would be first to admit that it is incomplete; his other writings make this point clear. Nonetheless, his findings have high-level potential significance as guides to the selection of procedures to assist teachers to perform according to the demands of certain kinds of teaching.

For several decades, teacher groups have engaged in formulating comprehensive sets of educational objectives. Nerbovig's (30) study revealed that elementary-school teachers, especially those with considerable teaching and curriculum-planning experience, use objectives to relate their planning, selection of learning opportunities, and evaluation of pupil progress to educational objectives. However, there appear to be no studies establishing an actual relationship between increased clarification of educational objectives and improved discrimination in the selection of classroom learning opportunities for students. In the realm of evaluation, Bloom and his associates (4) found little teacher appraisal of cognitive behavior above the level of mere possession of information, even when stated objectives called for more profound levels of cognition.

One of the reasons why a relationship between teachers' clarification of objectives and specific classroom practices has not been established may be that both aspects of curriculum planning have been global. Wood's (50) attempt to classify objectives for teacher education from an analysis of catalogs from 239 institutions of higher learning revealed part of the problem: For the most part, the statements of objectives were too general or broad to be classified by any taxonomical scheme. Provus (33) illuminated another part of the problem: Educators are likely to see only one type of behavior in an educational objective when, in reality, two or more may be involved. He investigated social problem-solving behavior, identifying two affective behaviors in what at first appears to be a strictly cognitive process. He did not identify any significant relationship between these affective behaviors and intelligence as measured by IQ. Failure to recognize the presence of these behaviors in an otherwise cognitive objective could well result in failure of teachers to provide instructionally for a significant part of the behavioral change sought. Further analysis of the structure of educational objectives is needed, together with analyses of the kinds of teaching and learning processes necessary to attainment of all parts of a single objective.

It is a popular belief in some educational circles that involvement of teachers in curriculum planning leads to increased satisfaction on the part of teachers and increased learning by students. McGuire (26), however, was unable to obtain evidence in support of the following proposition: The participation of teachers in co-operative programs of curriculum planning

results, other things being equal, is significantly greater improvement in student achievement than that which occurs when the curriculum is planned either by administrative personnel alone or by teachers working individually. Sincock (40) formulated a model separating research (of an action type) from nonresearch methods and consensus-giving processes from processes based on dependency on status leaders in curriculum planning. He was unable to establish a significant relationship between method or process used and satisfaction of teachers with curriculum study programs. Nonetheless, the teachers scored the consensus-research combination highest as their ideal model for curriculum study. Apparently, however, they were dissatisfied with the relative amounts of consensus-research experienced in the projects. Much remains to be learned about *what* should be planned by teachers in improving curriculum practices and *how*.

No new curriculum designs were forthcoming. It is yet too early to determine whether the two-track plan devised by Stoddard (45), team-teaching projects, and widespread interest in nongrading will result in fundamental reordering of the elementary school curriculum. Other chapters of this issue report critical re-examination of content at all institutional levels, different approaches to curriculum organization and presentation in various fields, and earlier presentation of content formerly taught at higher grade levels. Such trends at the institutional level should be compared with proposals at the societal level reported earlier in this chapter.

One trend reported in Chapter III deserves emphasis. Rapid accumulation and reordering of knowledge render obsolete the old additive approach to curriculum planning. One alternative, long recognized by some theorists, proposes the selection of a few major principles, ideas, generalizations, or methods of inquiry and the organization of relevant content around them. The need for approaches of this sort is now urgent. Dooley's (10) dissertation, dealing with geographic concepts, and a series of dissertations in the social studies published by Stanford University (1, 12, 14, 31) offered methodological and substantial suggestions for organizing the various fields longitudinally. Until fields of knowledge are viewed and catalogued in this way, schools and school systems attempting to break down the lock step of grade structure will not move far beyond the grade-level, topical placement of subject matter with which we are now plagued. There is no need, however, for the entire process of developing new approaches to be duplicated from the bottom up by each institution. This is the kind of undertaking best assumed by major research centers, which could then disseminate findings for appropriate consideration at the local level.

The college subject-matter specialist increasingly is becoming a self-styled expert in curriculum planning at lower levels of education. Ruml and Morrison (37), however, seriously questioned the ability of college personnel even to plan respectable curriculums at the college level, main-

taining that college departments, in the main, are unable to rise above departmental self-interests to unbiased consideration of what constitutes first-rate general education. Ruml and Morrison recommended increased board study of curriculum questions and the establishment of faculty-trustee curriculum committees having powers transcending departmental authority. Goodlad (19) proposed a three-dimensional model for organizing and interrelating data relative to the subject, the learners, and learning processes at both institutional and instructional levels; such a model would provide a basis for balance in curriculum organization, thus avoiding the familiar swing of the pendulum from child-centered to subject-centered extremes.

Tjerandsen (46) observed an unfortunate tendency of curriculum recommendations in social-science general education to reduce complex or composite problems to only one, or a few, of the considerations involved. Such reduction, he claimed, ignores the fact that the problem of the curriculum necessarily involves method as well as subject matter, subject matter as well as aims, and some rational organization of these aspects of curriculum into a meaningful pattern. He developed a scheme involving these necessary components and used it to analyze 63 articles in the periodical literature dealing with general education and the social sciences. Among his findings were: (a) With but few exceptions, the papers omitted discussion of aims, or subject matter, or mode of operation, or two of these. (b) Even though several kinds of conclusions about the curriculum were treated, they were not treated in terms of their interrelationships, and thus no structured form of the curriculum emerged. (c) In general, conclusions were offered without appeal to a sufficient range of grounds or sources of data to disclose adequately the reasons for arriving at them. Furthermore, only a few writers indicated their intentional restriction of treatment, suggesting a lack of awareness as to what an adequate treatment should include. It would appear that these social scientists, subject-matter specialists, strike out as curriculum experts.

Tjerandsen's study further supported the conclusion that curriculum is not yet widely established and recognized as a field of disciplined inquiry—with its unique problems, methods, and data-sources—even by educators planning for their own institutions.

In Conclusion

Curriculum study needs theoretical constructs from which hypotheses can be derived and empirically tested with a view to determining, for example, how curriculum content has been established. From this chapter and subsequent ones could be derived a long chapter simply listing the multitude of topics worthy of research. A few are proposed, to suggest the richness of the potential harvest awaiting the eager researcher's whetted scythe:

1. Conceptual systems which identify the major questions to be answered in developing a curriculum must be rigorously formulated. The elements that tie these questions together in a system must be classified; subordinate questions must be identified and classified properly in relation to the major questions; sources of data to be used must be revealed in answering the questions posed by the system; and the relevance of data extracted from these sources must be suggested (18).

2. Theoretical constructs are needed from which research studies may be derived to demonstrate how values and expectations of individuals and groups find their ways through various channels of communication and political (conceived in the broadest sense) structures to influence curriculums.

3. Studies are needed to determine what types of subject matter (languages, for example) are best taught simultaneously, as contrasted with those best taught consecutively.

4. Studies are badly needed to show with rigor and precision how best to arrange material in a field for effective learning. This problem is of broader significance than the traditional problem of grade placement of content. The best solutions will not be forthcoming from analysis of subject matter alone. To lay out material according to some principles of increasing complexity derived from the subject is one thing; to provide sequences of learning opportunities according to insights derived for observing how students of varying abilities and past accomplishments best learn is quite another.

5. Taxonomical analyses of educational objectives must be extended into psychomotor and affective realms, and potential uses of resulting taxonomies must be more thoroughly exploited. In addition, structural analyses of objectives would help to reveal to teachers the range of specific behaviors with which they must cope in seeking to achieve any broad educational goal.

6. Global approaches to the establishment of relationships between curriculum-planning processes and improved instruction and learning must be replaced by research studies more precisely isolating and comparing process-product factors.

7. There is need for further research exploration of the teacher-pupil relationship (as revealed and expressed in the learning-teaching act) examined in the socio-psychological framework of reference groups and role conflict.

It is conceivable that the two-dimensional model developed by Getzels (15) and productively applied to the understanding of administrative behavior (20), supervisory processes (27), and instructional groups (16) could be applied equally productively to the understanding of certain curriculum decision-making processes. Curriculum theorizing to date is best described as abstract speculation; curriculum research as "dust-bowl" empiricism; and curriculum practice as rule-of-thumb guesswork (often a wet thumb, at that, held aloft to test the direction of the prevailing

breeze). Perhaps increasing interest in curriculum as a field, and in curriculum problems generally, will lead to the reporting in subsequent issues of the REVIEW of conceptual schemes which separate logical from empirical questions and point to appropriate sources of data; theoretical constructs which lead to meaningful, cumulative empirical research; and curricular practices which stem from answering appropriate questions with tested data selected from pertinent sources.

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CHAPTER II

Forces Influencing Curriculum

ALICE BRESLOW, JEROME DISQUE, GUNNAR SAUSJORD, ROBERT SMITH, STANLEY SOLES, FRED WILHELMS, and METTA ZAHORSKY

In TODAY'S society changes come at a rate never before approached. To cause such rapid change, there must be forces of unprecedented power, and such forces inevitably affect school curriculums. The school authorities who make a decision about a curriculum and the lay groups and individuals who press for such a decision may not realize that they act in response to an underlying force. It may be years before the connection between background factor and specific decision becomes clear, but the choice is no less a response.

The forces are difficult to identify while we are living in the midst of them. And to assess the contribution of each is almost impossible. Long-term shifts in socioeconomic conditions, international relations, and significant values may have more important results than occurrences that are specific, dramatic, and highly visible.

Three categories of forces influencing curriculums and what research says about them are included here:

1. Forces generated by special-interest pressure groups consciously attempting to direct school policy for their own purposes. These probably exert the most commonly identified pressures upon the schools.

2. Forces arising out of general social and technological trends throughout the world, accentuated by the increased communication among nations and the rapidity of scientific development. The immediate effects of these are difficult to analyze.

3. Forces generated by new insights from the scholarly fields, particularly as to the nature of man as a learner, the dynamics of groups, the nature of the school society, and its relation to the larger community. These insights influence decisions at first only in narrow circles. Over a time, however, they furnish an increasing pressure of ideas upon the professional educator and the public.

Specific Pressures of Special-Interest Groups

The turbulent period covered by this review is marked by activity of pseudo experts in education, armed with the results of some measure of inquiry and adroit in techniques of publicity and persuasion, ready to prescribe specific modifications in school and college curriculums.

Ways in Which Pressure Groups Function

One issue of the *Annals of the American Academy of Political and Social Science* (12) provided a range of helpful background material on the ways pressure groups function to influence legislation and to channel public opinion.

Vincent (150) traced the struggle over federal aid to education and described the stands of pressure groups as reflected in testimony on the Educational Finance Bill of 1954. He concluded that a general program of federal support for education foundered on the issue of what to do about auxiliary benefits from federal funds for Roman Catholic schools; and that school construction proposals were hampered by the background struggle over desegregation.

Pressures over Desegregation

Pressures generated by the 1954 and 1955 Supreme Court decisions ruling racial segregation in the schools unconstitutional precipitated a chain of events having far-reaching effects. This topic was also discussed in the October 1959 issue of this REVIEW (41). The Phi Delta Kappa study by Wey and Corey (152), even though it suffered from vagueness, provided guidelines for desegregation programs based on analysis of the experiences of 70 school districts. The experience of these districts indicated that there is no ideal plan for desegregating schools.

Two problems are the possible loss of jobs by Negro teachers and the frequent need to abandon Negro school buildings. (Some buildings have been turned into recreation centers for Negro communities.) The cooperation of the police in taking firm and quick action if needed was found to be essential. So, also, was firmness in adhering to whatever desegregation plan had been agreed upon by the community at the outset. As far as instruction goes, desegregation seems to have stimulated renewed efforts to improve instructional programs for all children. "Students are making more rapid progress toward race acceptance than are parents. When the students now in school become parents, many of the problems that seem insurmountable will decrease in importance" (152).

Suchman, Dean, and Williams (138), drawing on the Cornell Studies in Intergroup Relations, summarized existing knowledge in the field of social science that has promising relevance to desegregation as a social process, posed propositions for research, and outlined needed studies on desegregation processes. Tumin and others (149) found differences in attitudes toward desegregation among white citizens in Guilford County, North Carolina, related to differences in education, social status, and access to mass media—the "hard core" of opposition being centered in the lowest socioeconomic level of the white population. A negative image of the Negroes was common to the white population, but attitudes toward

desegregation ran the gamut from advocacy to willingness to resort to violence in defense of the *status quo*. The study design was significant in two aspects: the use of a team of graduate students to do the study as an aspect of their training in social research and the use of consultative resources drawn from several universities. Giles (56) summarized desegregation experiences in numerous communities, reviewed research bearing on intercultural patterns and issues, and devoted about one-third of his book to curriculum and instructional implications.

In a broader context, Ammoun (3) reported for the United Nations Subcommission on Prevention of Discrimination and Protection of Minorities. A citizen of Lebanon and Special Rapporteur for the Subcommission, Ammoun surveyed UN agencies, governmental and nongovernmental agencies, and the writings of recognized scholars. He reported rapid progress in most nations of the world toward breaking up traditional systems and sanctions for institutionalized discrimination. Discrimination in education based upon race, color, sex, religion, social origin, property, and political or other opinion is on the wane. Legal discrimination has been virtually eliminated except in a few scattered countries. As a political principle, discrimination in education is no longer defended except in a very few places. This does not mean that discrimination has been eliminated in practice, but it is being driven from positions which even a few years ago seemed impregnable.

Pressures of Specialized Interest Groups

Far more extensive research is needed, carefully designed, to assess the impact of special-interest groups on curriculum and instructional procedures and to assess the effect of such pressures on teachers and professors.

Jones (77) reported the plunge of the American Legion into the field of textbook analysis and criticism during the 1940's, including the later shift to interest in citizenship education. Skaife (132) warned schoolmen about the objectives of the Council for Basic Education, as well as about the nature of its personnel and financing. The impact of this group has been widely felt in education. Particular aspects of its program were assessed by Trow (148) and Hand (63, 64). Careful and extensive research to assess the means and processes by which the Council seeks to influence education should provide a basic contribution to knowledge of the operation of pressure groups. Improved ways of responding to pressures on education might emerge.

The impact of power politics on teachers was described by Burton (28), who showed that attacks on teachers regarding subversive activities often led to voluntary censorship by the teachers themselves of discussion of controversial issues. The pressures felt by college teachers of social science were studied extensively by Lazarsfeld and Thielens (90), who reported incidents of dismissal for unorthodox views and associations. They found

the pressures greatest in first-rank institutions, but they also found in such settings the strongest institutional support for freedom to teach.

Deam (40), using a 20-percent sample of Virginia school board members, superintendents, secondary-school principals, and social studies teachers, found most agreed on the need to deal with 20 selected controversial issues; but he found diffidence about treating the strengths of competing political and economic systems and the purported weaknesses of our own institutional arrangements. Deam concluded from the kinds of reservations expressed that the opportunities for high-school students to grapple with the basic issues of our time are in jeopardy; he believed full and free opportunity to study controversial matters—an opportunity crucial to the maintenance of democratic institutions—to be vanishing.

In response to national criticism, organizations of professional educators, with the assistance of their colleagues in fields of liberal arts, scrutinized the entire process of teacher education in an effort to increase its effectiveness. Smith and Robinson (134) described a summer workshop in which educators of teachers, university and college instructors in academic fields, and public-school personnel worked out some new guidelines for teacher education. The report recommended continued co-operative action by representatives of school administration, teacher education, and the academic disciplines to design and improve teacher education programs. State and federal agencies and legislators, private foundations, accreditation agencies, and other citizen groups, through financial assistance and ideological pressure, are also exerting influences upon schools. For the most part, these influences may have a healthy effect in speeding up curriculum change, but in some instances the demand is for a return to practices which the schools have legitimately abandoned. According to Morphet (110), the causative lag in public awareness of the goals and problems of public education is being tackled successfully in some state and local districts by the appointment of representative citizen groups to investigate school policy and make recommendations to boards of education.

General Social and Technological Forces

A school program may be influenced more by certain social and technological trends than by the efforts of individuals or groups. Such trends are hard to assess while we are still in the midst of them, and little scholarly analysis has been made of their impact. Nevertheless, their influence is significant.

The Impact of Foreign Educational Practices on American Education

The launching of Sputnik in the fall of 1957 inaugurated a period of unprecedented interest in European education generally, and in Russian edu-

cation particularly. The "great debate" on education was intensified as a result of the general economic and technological achievements of other nations. Alleged shortcomings and strengths of education in the United States were projected against the background of European educational practices. The rising tide of concern with European education filled professional literature and was reflected in all mass media of communication. A reorientation of the curriculum along traditional European lines was advocated by many, particular emphasis being proposed on mathematics, sciences, and languages. Such American practices as heterogeneous grouping and the use of the comprehensive high school were questioned. Conant (35) defended the comprehensive high school. Concern was voiced that the academically gifted child is not being sufficiently challenged.

Martin (102), analyzing the writings during the years immediately preceding and following the launching of Sputnik, found that evaluations of American education were more frequently "slightly negative" in character during the post-Sputnik year. Movements toward differentiated education for students of varying abilities and toward a particular concern for gifted students were noted. Opinions favoring utilitarian versus liberal education, and those favoring liberal versus utilitarian education, appeared to be evenly divided.

A generalized impatience with the deliberate, "waiting-for-him-to-grow" pace of American education led toward a partly punitive speed-up and a look toward European education as a model. A number of studies comparing achievement here and abroad appeared. Counts (36), in a scholarly work based on original Soviet efforts, traced the ideological sources of Soviet political and educational philosophy. He pointed to the challenge posed by the achievements of Soviet education. Also based on Soviet sources was a study by Korol (84), who, after surveying Soviet education, presented a detailed analysis of Soviet education for science and technology, documenting and evaluating the extent of its achievements.

Studies comparing the performance of European and American children in arithmetic were made by Buswell (29), Bogut (17), and Kramer (85). Buswell (29), comparing English and Californian children of the same chronological age, and using an English test adapted for the purpose as a measure, found English children superior. Bogut (17), using the same test, found children in St. Paul superior to Californian children, but inferior to the English children (although in the latter comparison differences in the problem-solving part of the test seemed small). In interpreting findings both investigators considered such factors as differing grade placement of topics, effects of mobility, effects of special coaching for crucial examinations in England, and teacher preparation. No information was given regarding the comparative total allotment of time for teaching arithmetic.

Tracy (147), using the Buswell version of the English test to compare North Carolinian children with the Californian and English groups, eliminated the race factor and the mobility factor by selecting *white* children from *stable* urban communities. (In discussing the findings from his study,

Buswell had pointed to these two factors, among others, as possibly contributing to the lower achievement of the Californian children.) Though the North Carolinian group scored higher than the Californian group, it still scored significantly lower than the English group, whose superiority was more marked in the computational than in the problem-solving part of the test.

Since the English group was tested at the point of terminal training in arithmetic, a point which is not normally reached in the United States until the eighth grade, Tracy also compared the achievement of English children of age 10.8-11.7 with eighth-grade children in North Carolina and found no significant difference between the achievements of the two groups on the total test. However, the North Carolinian group made relatively higher scores on the problem-solving part of the test, whereas the English group made relatively higher scores on the computational part of the test.

Kramer (85), using an adapted form of the arithmetic section of the *Iowa Tests of Basic Skills* to compare Dutch children in the fifth and sixth grades with Iowan children in grades 5 through 8, found the Dutch children considerably more advanced both in problem-solving ability and in understanding of concepts and processes. In evaluating the results, he considered various factors, including the widely differing allotments of time for arithmetic teaching.

The Kramer study found more drill content and more emphasis on mental arithmetic in Dutch textbooks. In grade placement of arithmetic topics, the Dutch books are approximately one year ahead of the American. More time is allotted to arithmetic in the Dutch schools. The pupil-teacher load in Dutch schools typically is heavier than in American schools. American instructional equipment is typically superior to Dutch. The sixth-grade average performance in the Netherlands was higher than the American eighth-grade average on arithmetic problem-solving. The marked superiority of Dutch pupils at low-ability levels suggested greater selectivity in the Dutch elementary schools as a partial explanation of the difference in over-all means. Performance at top-ability levels was similar for eighth-grade American students and sixth-grade Dutch students. Dutch children outperformed American children by a wide margin, but, when they were compared after a comparable amount of time devoted to formal instruction in arithmetic, their achievement was about the same.

These studies revealed such problems as those of equating age, amount of instruction, and tests used, so that the meaning of the results would be clear. Although these isolated studies indicated some greater specific achievements for European children, investigations comparing over-all effectiveness for long-range goals of foreign and American schools have not been made.

There is the possibility, however, that a thorough review of current practices in the United States will result from the claim that European education is superior. Gilchrist (55), reviewing recent innovations in high-school curriculums, discussed the experimental program in the improvement of

physics instruction at Evanston, Illinois, and the efforts of the Physical Science Study Committee of the Massachusetts Institute of Technology directed by Professor Zacharias. Improvement in mathematics instruction is the goal of projects at Illinois, Yale, and Stanford. Steady revision of foreign language instruction has increased the use of teaching aids, especially tape recorders, and put new emphasis on direct method, in which speaking and hearing the language precedes the reading of it.

Scientists' Influence upon Curriculum

An accelerated scientific and technological revolution was felt in the public schools. Scientists and educators alike re-evaluated their objectives, but evaluation of educational goals was hampered by lack of communication between educators and scientists. The former, trying to interpret scientific and technological trends which will vitally affect the educative process, were handicapped by lack of highly specialized understandings of the narrow disciplines within which scientists work. Scientists, on the other hand, often expected to transfer their training in particular disciplines to the curriculum without understanding the total educative process.

Many scientists have been highly critical of some of the social objectives of education. Some, like Hofstad (67), feared elimination of "the incentive of competition" that a "more fundamental curriculum" would furnish. Others, like Davidon (39), contrasted various American studies of scientific training in the USSR with Soviet reports on their own science education. Still other scientists were concerned with the fragmentation and fractionalization of the scientific disciplines. Meyerhoff (105), for example, took the position that schools and colleges should undergo a "restoration of learning" in the pure sciences to be accomplished by an all-out effort of the local school systems and the federal government.

Less critical than these, however, was a group of scientists and technologists who related the problems of education in a scientific age to the social role which the scientist must play. Rabinowitch (122) argued that we should not "abandon education for life"; that "to prepare our children to meet this dangerous and real world they will face we will have to give more attention to the place of science in the curriculum, since science now is the 'growing tip' of civilization." Many scientists saw a curriculum as primarily intellectual in character. Taylor (141), Schwab (127), and Barnes (7) took such a view. Others, in a variation on the same theme, saw the sciences as more closely related to the humanities. Ashby's "technological humanism" (4) was an intellectual approach to a philosophy of social control earlier voiced by Dewey in his "evaluation of technology" (92).

A last group of scientists came closest to the humanizing (as contrasted with the humanistic) objectives of curriculum. DuBridge (44), for ex-

ample, expressed the hope that students of science could return to that adventurous spirit of exploration which characterizes all investigation of the world of ideas. Taton (140) made a case for the teaching of the history of science as a means of inculcating a more functional understanding of the scientific age. Weaver (151) stated that the average citizen, "who fears science, should learn about it, so that it can be an exciting intellectual companion and a useful servant."

A few of the scientific and technological journals attempted to evaluate the impact of the scientific revolution on the schools and on society as a whole. DuBarle (43) called this the "paradox of the scientific mind": that the "scientist is torn out of his world of universality and integrated into a particularistic system which tends to cultivate science and foster its human implications only for its own survival and prosperity and for the spread of its own dominion." Interestingly, only two of all the journals reviewed (26, 71) devoted any space to discussion of the broader "human implications" of scientific research or technological development. One issue of the *Bulletin of the Atomic Scientists* was devoted to considerations of the social role of scientists as men of social conscience (61), or—in the statements by Rabinowitch (121) and Bronowski (23)—as citizens with more than a casual voice in political affairs. Still others in this same group, like Oppenheimer (115) and Thurring (145), believed that "international communities" of scientists should be established to seek out the implications of scientific development as it is related to policies of nations and broad social change. Significantly, too, this issue of the *Bulletin* was the only publication by scientists in which other disciplines were brought to bear on the problems created by the scientific revolution. In a joint exploration of common problems, specialists in the fields of sociology (123), psychiatry (101), and economic philosophy (124, 125) interpreted the behavioral disciplines; and physicists (95) and chemists (95, 151) interpreted their scientific fields.

Scientific and technological journals occasionally editorialized on curriculum or educational policy. Koontz (83) reflected segments of opinion of the American Medical Association; Hofstad (67), in the *American Scientist*, typified groups critical of public-school curriculums.

Various scientific and technological journals reported studies related to education in a highly specialized framework, dealing primarily with research projects, special training needs, and financial support. Some of the indexes, such as *Biological Abstracts* (11) and *Science* (128), included more items concerning education than heretofore, but such studies were of a highly technical nature.

Studies interpreting various scientific and technological disciplines as these affect curriculums appeared, but sparsity of such publication indicated need for better communication between scientists and educators in joint efforts toward curriculum development.

The Educational Impact of Alienation of Youth from the General Culture

Increasing development of a subculture of adolescents had an impact upon curriculum planning. In some degree adolescents have always set themselves aside from the culture of children and adults, but now the adolescent subculture is both more highly organized and more clearly separated. Alienation of youth from the general culture is evidenced by such things as a rising tide of delinquency (6); increasing influence of adolescent peer groups (155); adolescent fads of dress and speech; the special literature of comics and paperbacks primarily perused by this age group; particular television and motion-picture programs for youth; the cut-down, reassembled cars peculiar to teen-age drivers (65, 96).

This state of affairs influences educators, for they have a direct obligation to help induct youth into the adult society and to help youth meet its problems. When the two goals conflict, the task of the curriculum worker is complicated. Furthermore, the reaction of the lay citizenry to increasing delinquency and youthful crime, as well as other manifestations of the adolescent subculture, includes a good deal of sheer indignation and hostility toward youth. Such feelings in the adult citizenry frequently force "get tough" programs in the schools and, in general, influence curriculum planning.

The social causes for this alienation are manifold and hard to pinpoint. They may well be related to population growth, increased mobility, and urbanization. Miller and Swanson (107) set forth some factors in present-day life and family patterns which may be responsible. Parental anxiety is focused on one or two children in the typical modern home, making the children's achievement of independence more difficult than in the days of larger families. (Even though family size has been on the increase in recent years, the size is still small compared to the typical family size of a half-century ago.) Young people today are frequently financial liabilities rather than assets to their parents. The needs of children are often given priority over adult needs, and the heightened unconscious hostility of adults toward young people is reflected in the older age group's harshness to youth. There are many subtle encouragements by mass media toward development of a separate youth culture. Young people face severe value conflicts between competitive individual goals and more socially oriented endeavor, especially in choosing a life occupation and vocational plan. The organization of schools along age-grade lines from kindergarten, and the impersonal atmospheres of many large high schools, may be additional factors.

Sears and others (129) commented upon the unintended effects of a cult of overpermissiveness in the child-rearing practices of some present-day parents. Whereas many parents know that punishment may leave a strongly hostile drive bottled up within a child while eliminating a few

specific responses, some parents have assumed (wrongly, according to Sears and his colleagues) that to avoid punishing their children for aggression they must allow their children's aggression to go unchecked. But permissiveness increases the amount of aggression in the home and child. An angry child is not usually a happy, affectionate, or social child. He may be a source of discomfort to his family and friends and to himself. Overpermissive child-rearing practices may be still another source of youths' alienation from adults.

It is difficult to document the exact amount of increase in delinquency (98). Moore (109) pointed out the lack of uniformity of definitions of delinquency, differences in reporting and handling delinquents, and variations in referrals to other agencies, all of which make it hard to gather accurate information on the extent of juvenile crime. Kvaraceus (87) reported that adolescents are conscious of society's official rules, but that some lower-class adolescents automatically violate certain legal norms by following behavior patterns approved by their socioeconomic groups. In urban centers many activities are illegal today which were accepted as normal adolescent pranks during parents' youth.

Perhaps educators underestimate the drive of adolescents to close the gap between themselves and adults. Carlson and Sullenger (30) reported that Omaha high-school youths desired counseling for the attainment of physical and mental health, charm, successful interpersonal relations, a happy home life, and effectiveness in work and study; in choice of a vocation and use of leisure time; and in development of a philosophy of life. One survey (100) indicated that boys 14 through 16 years of age were more concerned with achievement and gaining emotional and social maturity than with leisure-time interests. Activities which let them assume responsibility or take adult roles at home or work made these boys feel important and useful.

Conflicts between the adolescent subculture and the general culture have resulted in attempts to bring adolescent behavior "in line" with adult perceptions of what it should be, primarily through punitive action. Delinquency studies indicated efforts through legislation to punish deviant behavior. Schools felt pressure toward greater strictness. The popular press, other mass media, and changes in school policies showed a tendency toward more punitive measures. Research is needed to determine the nature, extent, and value of these policies. Studies of the effects of expulsion, exclusion, and exemption should guide further efforts to cope with the behavior of youth.

Educators and community workers intensified their efforts to gain greater understanding of adolescent problems and to provide facilities and personnel to guide adolescents. The Phoenix Youth Study Proposal for Delinquency Reduction (31) is an example, and the school-community projects reported by Kvaraceus (87, 88) are others. The development of child-guidance clinics and their availability to schools constitute an-

other effort to approach the problems of youth positively (143). The need of teachers for greater knowledge about youth has been emphasized in many professional articles.

The alienation of youth from adults may be just one more example of general social trends toward depersonalization and isolation of individuals. Research in mental health (91) identified such alienation as one reason for the general increase in mental disease. It may be desirable that schools consciously "counter-trend" these forces of personal isolation. Drives for power, status, and prestige over others seem to be proportionate to lack of satisfactorily close, intimate, warm relations with others (117).

The Influence of Shifts in Values

Getzels (54) found "sacred values"—democracy, individualism, equality, and human perfectibility or optimism -still cherished, but identified certain "secular" values which are shifting "from work success ethic to sociability; from future-time orientation to present-time orientation; from personal independence to group conformity; from Puritan morality to moral relativism." Younger teachers and principals emphasized the emergent orientation, and older teachers the traditional value patterns. Superior students were found to prefer a traditional orientation, regardless of school and social class. Parochial-school students' values were significantly more traditional than public-school students'. Differences in values were found among students in different types of schools and within schools. However, no significant differences between values held by freshmen and values held by seniors were noted. Whatever values a student brought to the high school were changed little in high school.

The Influence of Changes in Family Life

The meaning for schools of much of the current accumulation of data on family life is not yet clear, although Freeman (52) presented 23 implications for education. Early estimates (78) of the 1960 census results predicted general characteristics of the American family, such as size, composition, urbanization, and economic status. Studies of patterns of family relationships indicated changing roles and functions of family members (25, 104, 156), but no specific trend emerged. Effects of increased mobility were studied in relation to turnover among pupils. Sexton (130) reported as much as 13 percent turnover in some low-income areas and found that frequent change interfered with success in school.

A number of studies of teen-age marriages, which continue to increase, were reported (27, 103, 111). The number of working women increased, as indicated by the National Manpower Council study (112) and Smuts'

historical analysis (135) of the changing role of women in the work world. Nye (113) and Siegel and others (131), studying the effects of mothers' employment upon the adjustment of their children, perceived less detrimental results than had been previously found. This may be the result of better child-care arrangements, of differences in the kinds of women seeking work, of better working arrangements, or of still other related variables. Interest in family research expanded, mostly in the formulation of conceptual frameworks (48) and methodology of study (32).

Mental Health Concerns and the School Program

The mental health movement directed attention to quality of human relationships. In an effort to explain the prevalence of personal unhappiness, marital strife, alcoholism, crime, difficulties in employment, and mental illness in present-day life, attention was focused simultaneously upon social organization, value conflicts, interpersonal relations, and individual life histories. Interdisciplinary research linking many areas of investigation provided, for the first time, a conceptual basis for understanding the individual in his relationships to his primary reference groups and to his society. A breakthrough of discovery is promised in ways to prevent mental illness and promote positive mental health. Jahoda (73) and Smith (133) formulated concepts of positive mental and psychological health in ways that lead to hypotheses that can be tested. Ackerman (1) spelled out the relationships between the mental health of the individual and the functioning processes and values in the family unit and in the wider society to which he belongs, contending that the historical focus on the individual has prevented a perception of the urgency of evaluating mental illness in terms of a family context. A meaningful concept of mental health comprehends the relationship of the functioning of the individual to the human relations patterns of his primary group. Ackerman perceived the ills of individual, family, and society on a continuum.

Schools are taking into account these interrelations between the pupil's effective functioning and that of his family. Parents are involved in curriculum planning; parent-teacher conferences are formally planned; specialists and courses in family life and mental health are being added to school staffs and programs (69, 89). But the attacks upon such efforts as "frills" indicated that they may not be fully successful. Perhaps these well-meant school programs were based upon too naive a formulation of the basic social and psychological processes underlying movement toward more effective functioning. Brim (19) and Kenkel (80) reported no positive conclusions about the usefulness of courses about family life. Hudson (68) indicated the unrealistic content of family-life textbooks for secondary schools. Cumming and Cumming (37) published a dis-

couraging report of their attempts to teach the principles of mental health to a Canadian community. Their direct conceptual approach provoked such hostility and anxiety that it had to be discontinued.

Ojemann and others (114) prepared curriculum materials for elementary and secondary schools on the concepts of mental health; they seem promising, but their usefulness has not yet been fully determined.

Perhaps these efforts simply ran into expected resistances to social change, and particularly to change involving the personality. However, research did not tackle the basic question of the relationship between teaching concepts about effective functioning and the production of effective functioning itself. Apparently the interrelationship is subtle; and methods of instruction, the particular content selected, and the background of teachers assigned to courses dealing with fundamental social and psychological problems may be responsible for negative results. Efforts to apply psychological and social understandings indirectly through community guidance clinics, counseling, and psychiatric consultation with teachers and school personnel fared more successfully (93). Most important of all is the direct application of principles of mental health to all the tasks of education—the basic organization of the school and the curricular experiences of the day.

The Influence of Changes in Group Life

The family studies cited earlier are but one illustration of increased awareness of the interdependence between individual behavior and the group contexts in which the individual lives in this era of increasing automation, urbanization, population growth, and intercommunication.

The development by psychiatrists of therapeutic communities (76) will not come as a surprise to the seasoned educator, who has long projected a school community in which interrelationships of staff would fully facilitate learning, development, and rehabilitation of all the pupils. Understanding of how to organize and promote desirable interrelationships between staff groups and patient groups which arise from attempts to establish therapeutic communities to treat the unemployed, criminal, and mentally ill, should have significance for school administration. Analyses such as that of Zaleznik, Christensen, and Roethlisberger (157) of the total structure of personal interaction around tasks of individuals in business may provide impetus to schools.

Popular interest in Whyte's *The Organization Man* (154) aroused concern about the loss of individuality, and the increasing demand for conformity by organizations. Perhaps some of the attacks upon the schools' emphasis on group life and social goals are a healthy protest against negation of the individual and may not be as damaging as some educators have feared. School life is group life; the manner in which the interrelationships of this group life are organized determines much of what happens to pupils.

Research in school organization developed. Etzioni (45) noted that the usual lines of authority and staff relationships are of necessity reversed in schools. Staff members (teachers) are the "experts" who ultimately implement major goals of the organization, that is, teach. Michael (106) reviewed innovations in high-school organization in a search for determinants of optimum size, and concluded that both small and large schools have their peculiar advantages and disadvantages. He believed that innovations need to be introduced into both types of schools to offset disadvantages created by their largeness or smallness, pointing out that small schools try to increase their status by becoming large schools, whereas large schools break down their organization into units to obtain the advantages peculiar to small schools.

Terrien (142) noted—along the lines of Parkinson's "law" (118)—that as organizations grow in size, the proportion of personnel devoted to administrative duties increases. Thomas (146) found that personnel of smaller units of departments of welfare service evinced greater agreement in their understandings of their roles, greater breadth of conception, higher ethical commitment, and better quality of work performance. Hall (62), examining organizational and administrative processes in 27 Illinois school systems, assessed the quality of education by the degree of diffusion of administrative procedures, or the extent to which certain tasks involved staff members in their execution. Further, the proportions of staff in administrative and supervisory work, specialized instruction, and auxiliary work were compared with the proportions in regular teaching. Quality of education determined in this way was related to the level of expenditure per pupil, but was *not* related to the size of the school. This study used measures which were readily quantifiable and applied adequate statistical procedures to the data.

Lynn (97) found small British schools failing to produce, in proportion to their enrollments, numbers of students who later became scholars, and cited the ability of large schools to attract better teachers as one explanation. Also, in Lynn's opinion, it is difficult for teaching to be efficiently organized in small schools, since pupils studying at several different grade levels are grouped together. He believed the large school provides a more stimulating and competitive atmosphere. The student bodies of the larger schools included more children who had higher measured intelligence (8 percent more students passed per 100 candidates), though the difference was not sufficient to account for the fact that graduates of larger schools won twice as many distinctions per 100 candidates as graduates of smaller schools. Admitting bias in favor of large schools, Lynn did not control the selection of students into large and small schools along socioeconomic lines, nor make allowance for the location of these schools in rural or urban areas, nor the variations in value that parents and others attribute to academic success in different places. The number of academic awards and high test results is, of course, but one criterion for judging the success of a school.

Mass Media and Automatic Teaching

The fact that more television sets are available and that programing has increased has raised questions about effects televiewing may have upon viewers, especially children.

Excessive televiewing as an "escape" was found to be associated with frustration and dissatisfaction in connection with status among high-school boys by Johnstone (74); and Pearlin (120) found that adults dissatisfied with job or status were partial to "escape" programs. Bailyn (5) found that only 3 percent of the boys in her sample were highly likely to use mass media as an escape, and they were rebellious, independent, and had many problems.

Himmelweit and others (66) refuted a number of myths associated with televiewing. Children did not become more passive as a result of televiewing, their eyesight was not damaged, and their school performance was not affected. Televiewing did not replace reading books or forming friendships. Movie attendance and the reading of comics were reduced. Although viewing habits were sometimes associated with IQ and personality, parents influenced viewing habits more than these two factors. Duller children watched television more than those of higher intelligence; emotional insecurity and maladjustment seem to impel children toward excessive consumption of any available mass medium, including television. If television is available to insecure or maladjusted children, they will view excessively; if not, they will attend movies frequently, listen a great deal to the radio, or devote a large amount of time to reading comics. Children of this type were characterized by being ill at ease with other children, and their teachers often described them as shy and retiring. They preferred plays of two escapist types—adventure-mystery and family serials.

In 1958 the Fund for the Advancement of Education (49) noted that 569 public-school districts made use of regular television in their programs; 117 colleges offered television credit courses; and 241 offered credit for "Continental Classroom," the nationwide network program then offering courses in physics and chemistry. Somewhere almost every college course is offered on television.

In 1952 the Federal Communications Commission decided to reserve one-tenth of the 242 possible TV channels for potential public, educational, noncommercial stations. Studies assessing the effectiveness of TV instruction are now under way. Hagerstown is in the fourth year of a five-year study utilizing six closed-circuit TV channels. Preliminary findings indicated higher achievement scores for students who used educational television, but the findings must be qualified by the fact that students also had teachers and teaching of unusually high quality. Dreher and Beatty (42), in a large-scale experimental study involving the use of matched sections of classes working in a number of subject fields, evaluated the teaching of college courses by television and found it relatively satisfactory. Mastery of sub-

ject matter appeared to be roughly equal in the regular and the television sections; attempts to measure other variables yielded nothing definite.

At the same time at which TV entered the classroom, the "teaching machine" and other automatic teaching devices were added to the list of available "canned" curriculum resources. (See Chapter IV.) How this automation is to be used is an urgent question. Will it displace teachers and add to the impersonalization of school life, or will it free teachers for their primary and unique function as personalizing agents of instruction, specialists in designing constructive interpersonal interaction for pupils?

Impact of Social and Psychological Research Trends upon Curriculums

The methods of behavioral research have yielded much of the knowledge about social forces and their influences upon schools discussed in the preceding sections. Certain trends in research in these disciplines now influence the professional educator and, through him, the curriculum.

Social Groups and the School

The group life of the school is an important part of the social context within which curriculum decisions are made. Research in sociology and social psychology on group life in schools indicated a shift in conceptual focus and a refinement of methodology. The last three years showed a changed emphasis; there was a shift from studies about social class to studies about values, and from studies about classroom social atmosphere to studies about the social climate of the entire school.

For more than a decade educational writings have emphasized the findings of studies which related social class to other variables. Gross (58) thought it possible to conclude that "nearly every phase of school functioning is influenced by the phenomenon of social class." But, he added, many investigators have not noted the negative cases and the variability of educational behavior within each social class. Bronfenbrenner's critical review (22) of studies of social class and child rearing during the last 20 years is illustrative of critiques of both methods and conclusions. He reconciled the many apparent contradictions of the findings of various studies of social class by noting that the studies were done at different times and places. In addition, he noted that innovations in child rearing are accessible to some receptive members of social classes sooner than to others.

Since Hyman (70) reported on how variations in values occur within social classes, researchers have included value considerations as well as factors of social class in their studies. This shift was illustrated by Kohn (82) and Dahlke (38). Parsons (119), utilizing the school class as a unit of analysis, traced what happens as students progress from grade to grade.

He analyzed the way in which the school class operates as a social system in the socialization process.

An important part of the school's function in preparing students for adult roles is the transmission and changing of values. Questions of how the school curriculum can be made more effective in changing students' values arose immediately following the publication of Jacob's conclusion (112) that no significant changes in values of college students could be attributed to the curriculum. Since the curriculum seemed to have little influence on changing values while students were in school, pertinent questions for research became: What influences the acquisition of values? How are values transmitted? How may the school program influence values of pupils? As noted previously, Getzels (54) reviewed the empirical studies of values and saw differences in values among different types of schools and within schools. However, no significant changes in values of students occurred during high-school years. Spindler (130) described how teachers may unwittingly impose their value biases upon students and transmit value conflicts which are present in the culture at large.

One source of information about influences upon the choices and values of students was their subcultures. Some investigators extended the scope of inquiry to include the entire school as a social system. Fielder (47), studying high-school students' perceptions of the hierarchy among student organizations, found a distinct youth subculture. Gordon (57), who studied high-school students, and Freedman (51), who studied college students, found that the student culture built to a peak during the junior year.

Both Gordon and Fielder reported that teachers' judgments of student preferences were inaccurate. Gordon found that school grades were least predictive of student status, and roles in student activities most predictive. Fielder noted the difference between the formal lists of members of school organizations and student comments about their actual membership. The majority of the students were members of the formal organizations of the school, but most of them felt left out and had a sense of estrangement from the school at large, because they were not involved in the power structure. These studies indicated that students develop sets of school norms for behavior, school traditions, and value preferences within the school. Wise curriculum planning would include careful study of student organizations, so that the total education of students would be more deliberate.

The question "To what degree do peers or adults influence decisions and values of adolescents?" was studied by French and others (53), who found that youths rely upon parents in making long-range plans for college, work, marriage, the armed forces, and the like, whereas adolescents are least influenced by parents and more influenced by peers regarding teen-age problems and sex relations. In contrast, Wilson (155) found the role of the school to offset the influence of the family. He reported that the values of the majority of the students in a high school provide a sufficiently significant normative reference to indicate that the ethos of the school

affects student academic achievement, occupational aspiration, and political preferences. For example, Wilson compared the educational aspirations of students from a series of schools, holding constant the parent's occupation. He found that significantly fewer students from the working-class school wanted a college education than students from a predominantly middle-class school, although both groups had parents who were professionals. More research is needed to fit these findings into a scheme which shows how parents, peers, and schools influence values.

The variation of social climate from one school to another has been observed to have important effects upon student choices (34, 74, 155). Coleman (34), in a study of 10 schools, found further evidence of the way the school program, formal and informal, acts to channel student choices along given lines. He believed interscholastic athletics to discourage scholastic attainment, and noted that, in schools which emphasized athletics, students with the highest IQ's did not get the highest grades, whereas in schools without interscholastic athletics, the highest grades were made by students who scored high on IQ tests.

The Interpersonal "Unit" in Psychological Research

Psychology sought what Allport (2) called new "units of measurement." Emphasis, which earlier moved from the part-functioning of organisms, from "faculty" psychology, to study of the "whole person" as an entity, now focused on the interpersonal interaction of individuals. Such a trend can be documented by the growth of research in social psychology (94, 126), group processes (144), interpersonal perception (139), systems of communication (20, 116), and social psychiatry (91). The trend corresponded to that of research in mental health and family structure noted by Ackerman (1).

The subject of study is the individual human being interacting with others. Man's behavior is considered to be jointly determined by the nature of the systems of interaction in which he is functioning and by his own biological and "historical" self which he brings into each relationship. The behavior of some individuals is determined more by their history (15, 16); others, perhaps the more flexible, respond primarily to the forces operating in each situation. Such emphasis is wholly different from the emphasis of the past search for personality "traits." The relatively stable core responses of people are still being investigated (2), but as new methods for changing behavior are identified through work in perception, communication, and group processes, the static personality "trait" is in question. As Blake and Mouton (14) pointed out, "The adjustment of an individual in a group situation is related only in part to personality factors."

The same shift from exclusive concern with the individual to more focus upon interpersonal interaction is an evident trend in psychotherapy. The

use of group psychotherapy increased (13, 81). Bateson and others (10) and Brodey (21) examined family patterns of interaction in an effort to discover how schizophrenia and comparable conditions may emerge. Development of therapeutic communities for psychiatric treatment has been mentioned.

Though it may be some time before these shifts have direct impact upon curriculum planning and classroom procedure, so fundamental a change in approach to the study of persons must in the long run have great effect. If interpersonal interaction is relatively so important in comparison with inner traits as the frontier investigators in psychology assume, then curriculum planning will have to make primary the provision of opportunity for optimal interaction.

Attitudes, Personality, and Education

Educators have long been aware that many attitudes which they attempted to change by presentation of information and by discussion seem too deeply rooted to yield. Ego defenses have been shown to be related to emotionally based attitudes (79). If the attitudes are to change, the defenses may have to change; and, in order to be efficacious, education may have to influence what in the past have been considered the very roots of individual character. The studies of so-called "brainwashing" (46) suggest that it is these character-based attitudes which have been influenced, and influenced by the very same processes which initially built character. Apparently adult character can be changed by strong negative forces; psychotherapy suggests it can likewise be changed by strong positive efforts.

"Understanding" and the Professional Educator

McDonald (99) saw increased understanding of interpersonal interaction as an opportunity for the "profession" of education to further develop. The educator can move away from routine application of teaching techniques and methods as a "craft" to a professional diagnosis of the interpersonal processes of each learning situation and select the appropriate teaching methods from available repertories. Coladarci (33) defined teaching as an act of inquiry, continuously generating and evaluating procedures, reaching tentative or probable conclusions. Involvement of teachers in action research is one evidence of this trend. The teacher is viewed as a maker and tester of hypotheses. Krumboltz and Farquhar (86) demonstrated the superiority of eclectic teaching methods based upon understanding over rigidly applied instructor-centered or student-centered techniques.

Creativity, Cognition, and New Concepts of Intelligence

Intelligence is no longer conceived as stable, unitary, and uninfluenced by environment. Measures jointly determined by native potential of individual selective sensitivity and by exposure to a series of cultural events were sought (108). Guilford (59, 60) reformulated this new construct of intellect, and attention was directed again to studies of thinking and cognition (9, 24).

There was interest in the nature of creativity (50), imagination (8), and scientific innovation, partly a reflection of the space-age valuation of scientific endeavor, and partly a result of better understanding of intelligence. With a changed conception came attempts to locate this talent more efficiently (18). Eventually this research will influence the practice of intelligence testing in schools and the use of intelligence-test results for grouping and instructing pupils.

Learning and Behavioral Goals

Behavioral goals have long been educational objectives, but the significance of defining all learning as behavior change, the learning of new responses, has not yet had its full impact upon educational practices. The most careful studies of behavior change were evaluations of psychotherapy, which provided many indications of the kind of evaluation necessary to assess behavior change in educational settings.

The stimulus-response formula in learning studies led to a search for the elements of classroom interaction which elicit desired pupil responses (99). What pupil responses can be predicted from what teacher behaviors? The intermediary processes which go on between the measurable stimuli (teacher behavior) and obtained response (pupil behavior) are inferred. Motivation, a primary focus in many educational studies in the past, is such an inferred process, and is now questioned as a useful explanatory construct (153). Search for hierarchies of precipitating stimuli, antecedent-consequent relationships, replaced a search for "motives." One of the most provocative discussions of motivation was that of the 1957 Nebraska Symposium on Motivation (75).

As research in psychology moves its focus from rats to human affairs, educators will want to watch developments for applications to curriculums. As Stephens (137) points out: "A current broad attempt to make psychology more useful for education may by-pass educational psychology to some extent." Each educator will want to keep abreast of emerging trends in the basic research into man's behavior.

Conclusion

In a complex society, it is extremely difficult to identify the forces influencing curriculum development. It is even more difficult to trace the

processes through which cultural influences are transmitted into curriculum practices and to relate any specific practice to a societal force or condition. Nonetheless, we know that the values, beliefs, and aspirations of a people do, indeed, find their way into the subjects, topics, and materials studied by learners in educational institutions. One need only examine, at intervals, the courses of studies prepared for use in public-school systems to realize the truth of this last statement.

This chapter reveals a paucity of studies clearly showing the forces now influencing education, the channels through which influences find their way into the schools, and the impact of given beliefs or bodies of knowledge on curriculum practices. The reviewer is forced to sift through a miscellaneous array of studies, theories, and opinions in search of material that appears relevant to the kinds of curriculum decisions that are being made, or should be made. In the process, he is forced to construct both his own theories of curriculums and his own criteria for selecting and interpreting writings that appear to him pertinent to these theories. Consequently, it is improbable that any two persons preparing a chapter such as this would come up with similar sets of references or comparable interpretations. No doubt this lamentable condition will continue until more rigorous conceptual schemes for identifying curriculum questions and data appropriate to their solution are available.

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CHAPTER III

Components of the Curriculum

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THIS CHAPTER attempts to identify four components of the curriculum: (a) objectives, including both behavioral and content components; (b) types and quality of opportunities for learning, including organizing centers for learning; (c) organizing threads and patterns of organization; and (d) evaluation procedures. Careful consideration also has been given to the extent to which studies have turned to promising sources of data. The studies reported are confined to curriculum development up to the point of classroom instruction. The implementation of curriculum components in the classroom is the subject matter of Chapter IV. This chapter is organized in terms of decisions in (a) content areas encompassing all levels of education, (b) elementary education, (c) secondary education, and (d) higher education. Criteria for assessing decision-making processes and needed research are reported at the close of the chapter.

Increased interest and activity in curriculum problems, particularly with regard to content, characterized the years 1957-59. Contributions of large-scale group undertakings to a marked acceleration of demonstrations and studies are illustrated by the annual reports of the Carnegie Corporation (14), the Ford Foundation (33), and the Kellogg Foundation (57); summaries of projects supported by the U. S. Office of Education (93); and the yearbooks and journals of national professional organizations such as the Association for Supervision and Curriculum Development.

In the absence of an adequate conceptual system to guide curriculum decision-making, the literature still relies heavily upon the opinions of competent educators and informed citizens. An attempt has been made to report such studies as are available in addition to selected writings which, though they may not satisfy the criteria of rigorous research, nevertheless accurately reflect the state of the field.

Curriculum Decisions in Selected Content Areas Encompassing All Levels of Education

The rapid increase of knowledge, the scientific achievements of competitor nations, international tensions, and considerable shifting of opinion concerning the superiority of education in American schools contributed to an acceleration of experimentation in reorganizing content areas. Many

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undertakings along these lines had their beginnings in pre-Sputnik days (2, 5, 7, 63, 73). A number of questions concerning content and quality of learning experiences came to the fore. Subject-matter specialists assisted with curriculum revision through analysis of primary sources for basic concepts (6, 44, 63). Several areas were viewed in an international perspective (29, 43, 74).

Large-Group Undertakings

Large-scale demonstration projects were developed, especially in science (44, 63), mathematics (6, 56, 75), and foreign languages (66, 52). The National Defense Education Act of 1958, an expression of national concern for curriculum improvement in these areas, gave impetus to related study. Large-group undertakings usually involved representatives from colleges, universities, and communities, specialists in education, and classroom teachers. Team planning by such groups made possible the designing of larger and more comprehensive research and experimental undertakings than researchers working individually have been able to develop. Substantial grants from various foundations supported many of the studies (44, 58, 63, 86).

The projects cited have several common characteristics: (a) identification of basic concepts and generalizations involved in new theories and knowledge; (b) development of instructional materials to bring new knowledge and ideas into the curriculum; (c) production of instructional materials for the various grade levels from kindergarten through grade 12, and production of materials for teachers; (d) plans for teacher orientation and training in the use of new materials; (e) experimentation and evaluation in selected schools.

Mathematics

Efforts to improve the content of school mathematics courses and instruction in them were widespread. Commissions, committees, and work groups were organized at the national level (71, 73, 74), the state level (2, 50, 95, 96), and around centers such as the ones at Yale University (9), the University of Maryland (55, 56), and the University of Illinois (6, 7, 75). Working groups, especially those at university centers, generally included college and university mathematicians, high-school and elementary-grade teachers, experts in education, representatives of science and technology, and sometimes social scientists and psychologists. Some university centers were directly involved in state programs.

Normative and action research characterized the work of these mathematics groups. The major undertakings included: (a) analysis of modern theories and ideas for identification of basic concepts appropriate for

teaching in the schools; (b) production of new teaching materials; (c) testing of experimental units in the schools; (d) preparation of expository monographs; and (e) production of instructional materials for use in teacher education (7, 9, 55, 56, 75).

Several of the university committees have developed institutes, workshops, and training sessions for teachers and for writing groups as means of expediting the proposed new mathematics curriculum. Pilot schools were used to test new instructional ideas and materials.

Physical Sciences

The Physical Science Study Committee—formed at Massachusetts Institute of Technology in 1956 and including college, university, and industrial physicists, high-school physics teachers, and school and college educators—laid the foundation for a new course in high-school physics. The project aimed to develop a syllabus, a textbook, laboratory apparatus, manuals, teaching films, guides for teachers, and a series of books for supplementary reading. Experimental use of the course in selected high schools, orientation and training of teachers, and evaluation and modification of materials were a part of the operation (30, 31, 32, 63).

Biological Sciences

The Biological Sciences Curriculum Study was established in 1958 by the American Institute of Biological Sciences. A set of recommendations for education from kindergarten through graduate and professional schools is expected to be an outcome of the study. The study members "visualized from the first that such a study necessarily must involve not only the content of the courses, but the entire teaching-learning process at all stages" (44). Attention was given to effective use of mass communications media. The steering committee included professors of biology, high-school biology teachers, science co-ordinators, science educators, personnel of state departments of education, medical and agricultural educators, and university administrators. The major committees dealt with curriculum content, innovations in laboratory instruction, teacher preparation, gifted students, and publications (44, 45).

Social Studies

The National Council for the Social Studies, through its Committee on Concepts and Values, developed a bulletin (72) which defined the scope of the social studies curriculum from the kindergarten through grade 14. The Committee drew upon the thinking of scholars in the social sciences

and stated central principles and values of a free society in the form of 14 themes to guide selection of content. It would be necessary for local school systems to take into account the needs of their learners and communities in drawing implications from this document. In California, a State Central Committee on Social Studies engaged in a similar task, focusing on concepts from the social sciences and on criteria for the selection of content (13). The Committee also gave consideration to child growth and development, the learning process, and the placement and function of the social studies in the curriculum. Questions were also discussed which would assist local schools in developing their programs within the framework established by the California State Department of Education.

A group of doctoral dissertations at Stanford University, each dealing with one basic human activity (3, 27, 37, 76, 78, 80, 81, 88), attempted to identify generalizations that would aid content selection in the social studies. Primary data-sources were analyzed; recognized experts in the various disciplines were consulted. Generalizations were screened by a jury through a rigid set of criteria. Methodologically, an interesting feature of these studies was the fact that only generalizations unanimously approved were included in the findings.

Coordinated Education Center

In a noteworthy project (94) the University of Pittsburgh and the Pittsburgh Public School System established a Coordinated Education Center for research, experimentation, and demonstration throughout the several content areas and from elementary to graduate school. The Center's objective was to encourage action by schools, colleges, and universities to meet the challenges that face education. A unique feature of this project was the effort to articulate major units of the American educational system.

National Curriculum

Some of the large-scale studies tended to support the case for development of a national curriculum, a controversial issue that has emerged since the last reporting period. Hanna (46) proposed a national curriculum laboratory with a team of representative specialists and lay people to develop a comprehensive national design; he asserted that the greatest hope for national survival and for the perpetuation of American values lies in over-all planning and that he believed it possible to achieve national agreement on basic curriculum problems. Subsequently, a conference report (92) recommended that groups be established to define objectives, content, and organization of the public-school curriculum and that a national commission be set up "to deal with priorities and other overriding curriculum matters."

The significant question raised by the national-curriculum issue was: "What kinds of curriculum decisions should be made at what levels of our political structure?" The projects under way in mathematics, the physical sciences, the biological sciences, and the social studies resulted in a movement toward similarity and standardization of programs. The extent to which local curriculum workers deal with proposals from national groups in terms of the uniqueness of their own learners and their own values and beliefs will determine the ultimate worth of the large-scale group efforts cited. A particularly useful document to assist in this assessment was Brackenbury's (11), in which he discussed the practicality and usefulness of philosophy in resolving curriculum issues.

Curriculum Decisions in Elementary Education

The years 1957-59 did not bring forth studies in general elementary education of comparable comprehensiveness and magnitude to those reported in the previous section. Several investigations cited above included the elementary school. There follow some studies in elementary education dealing with objectives, curriculum patterns, evaluation, and citizen interest in the school.

Objectives

Although objectives continued to be a primary concern in studies of elementary education, there appeared to be lack of agreement on basic references for determining them. Bridgers (12) found little research focused upon objectives but reported an investigation of the aims of public education as determined by the writings of eight curriculum authorities. The Estvans (28) reported the results of a long-term research project on children's social perception. They used a projective approach based on a life-situation picture series consisting of 14 scenes, each dealing with a basic social function. Their findings are a fundamental source of data for the formulation of elementary-school objectives. They concluded that the nature and development of social perception points to the need for both differentiation and synthesis in school programs, which must be viewed as a whole. Learning experiences of young children should be organized in short, relatively simple units that stress relationships between structure and function. Growth occurs as the child develops increased ability to make more detailed and analytical examination of closely related ideas, to place them in a space-and-time setting, and to integrate them with other bodies of knowledge.

Herrick (48), observing that objectives are generally stated in terms of the educated adult, of persistent problems of living, and of needs of

the child, asserted that the primary objective of public education is "to help children become increasingly competent to meet and deal with the problems of growing up to be constructive, participating members of our society." In an interesting and useful survey of public opinion about the tasks of the public school, Downey (24) ascertained that the regional sub-publics (which included both noneducators and educators in different types of communities) perceive the major function of the elementary school to be the teaching of the three R's.

Several factors seemed to demand re-examination of public-school objectives. Particularly relevant to primary-grade social studies was Crowder's dissertation (20), which showed that certain out-of-school experiences give young children insights that make emphasis on the near-at-hand an approach no longer valid. The influence of television, acquaintance with foreign visitors, and increased use of books in the home suggest the inclusion of content and experiences dealing with people out of the child's immediate environment.

Patterns of Organization

The development of the nongraded elementary school was a significant change in school organization during the period under review and one which has important implications for curriculum organization. Goodlad and Anderson (42) agreed that the removal of grades as the basis of organizational structure is an almost necessary condition for the full development of individual capacities. Their concept of grouping was suggested by study of how children learn skills and concepts. They demonstrated that success of the nongraded plan depends to a high degree upon the imagination used in grouping children for different kinds of learning. Many of the schools described were reported to have adopted a nongraded structure because of dissatisfaction with promotion policies, reporting practices, and other immediate concerns. The nongraded school supports the principle of longitudinal development of children and the search for organizing elements in the curriculum. The substance of the desired longitudinal view is a set of threads or organizing elements, of both behavior and content, running vertically through the curriculum, around which learning activities can be organized. The nongraded school yields a structure worthy of further study to determine methods of providing for continuous pupil progress along the organizing threads of the curriculum. Research needed in this area lies in the further study of these vertical arrangements, as well as in experimentation with horizontal curriculum organization.

Additional experimentation in curriculum organization included multigrade teaching (49), a two-track plan combining graded and nongraded instruction (87), and an integrated kindergarten-primary program (59).

Evaluation

Evaluation of participation in experimental programs revealed (a) improved attitudes toward education, (b) increased attention to needs and interests of learners, (c) increased use of problem-solving rather than "tell-and-do" techniques, and (d) broader use of instructional materials (48). A group of doctoral dissertations at Wayne State University evaluated public-school programs. Galbraith (36) conducted a case study of a school in an industrial city, describing the impact of rapid social change and slum living upon children and their school, and showing how a more life-centered curriculum was developed which influenced the children's total living. Analysis was made of the use of the school group as a medium of change, of the role of leadership, and of the nature of cooperative action by school and community. Coxe's (19) case study of curriculum improvement in the social studies showed how faculty and administrators defined their problems and worked together to resolve them. The participants analyzed and appraised their school programs, observed the impact of the community on children and youth, and created ideas, materials, and processes to improve the social education of the students.

Snyder (84) appraised through interview, questionnaire, and school records the effectiveness of a developmental elementary-school program as revealed by opinions of children, parents, and teachers and by subsequent achievement in junior high school. A major conclusion of her study was that the block plan of school organization in both primary and middle grades, the parent-teacher-pupil conference, and active parent involvement in many phases of the school program are supporting forces to the positive reactions. Sniderman (83), through interviews, observation, and questionnaires, evaluated the long-range effects of a five-year, action-research curriculum project. He found that highly active teachers in the project demonstrated continued interest in experimentation, undertook additional formal course work, and exhibited more positive attitudes toward curriculum study than their less active colleagues.

These four studies exemplify the many evaluative appraisals of school programs appearing during the period of this report. Little research emerged which contributed to the development of the theory of evaluation or of new evaluation techniques.

Citizens Look at the Curriculum

A unique effort in public education was that of the Citizens Advisory Committee on School Needs in Detroit (21, 22). Established in February 1957, the Committee spent 18 months determining the city's school needs for the decade 1959-69. Two hundred and seventy citizens organized into committees. They collected data about all of the major aspects of

the public schools through interviews with school personnel, civic leaders, and school officials in other communities, through visits to schools, and through meetings with consultants. Of 181 recommendations to the board of education, several related to the curriculum. Among those approved by the board of education which related specifically to the elementary-school curriculum were recommendations for: (a) self-contained classrooms in grades 1 and 2, (b) a plan whereby a teacher stays with pupils for at least a year, (c) experimentation with placement of social studies and study of language arts in the homerooms of selected schools, (d) expansion of library facilities, (e) study of the effectiveness of auditorium programs, (f) improvement of guidance and counseling services, and (g) an increase in the visiting teacher service.

Research needed on the elementary-school curriculum includes experimental studies of where to teach what (content appropriate to the maturity level of the child), testing of proposals for reorganization, and experiments aimed to resolve such issues as foreign language teaching.

Curriculum Decisions in Secondary Education

Awareness of the inescapable responsibility of the school in a democracy to cultivate individual talents, coupled with a heightened concern for the national need for capable manpower, brought about several projects aimed at improving the secondary-school curriculum, mostly survey studies.

Objectives

In a companion study to an earlier survey of elementary-school objectives by Kearney (54), French and others (34) reported the findings of an extensive appraisal of expectations held for the public high school. Their report, which represented the co-operative endeavor of six national educational agencies, stated secondary-school objectives in universally useful language. Lingren (62) reported a comparative study of the degree to which the "Ten Imperative Needs of Youth" were being met in selected high schools in Pennsylvania.

General Secondary Curriculum Studies

Conant (17) made firsthand observations of 55 high schools in 18 states. His survey sought to determine the extent to which all students are provided for, whether through terminal education or preparatory education for college. The criteria used to evaluate the comprehensiveness of school programs were developed after preliminary visits and were re-

viewed by a group of experienced educators. Among the most important of Conant's 21 specific recommendations were recommendations for an improved counseling system, individualized programs, and general education for all students. Recommended general education includes four years of English, three to four years of social studies (two of history and one of American problems), one year of mathematics in the ninth grade, and at least one year of science in the ninth or tenth grade. Graduation requires completion of at least seven more courses, not including physical education. All students should be urged to elect art and music. Students should be grouped according to ability. Academically talented students should complete four years of mathematics, four years of foreign language, three years of science, and four years of social studies, a total of eighteen courses with homework. Conant's distinguished reputation and integrity gave his report great influence, even though such criteria for determining answers to fundamental curriculum questions as the nature of the learner and the learning process and the unique needs of particular communities were not accorded the consideration they probably deserve.

Several studies of the influence on curriculum of school organization were made; Trump (89) reported experimentation sponsored by the Commission on the Experimental Study of Utilization of the Staff in the Secondary School. Variance in class size, utilization of technological aids, and use of various combinations of both professional and nonprofessional personnel in instruction formed the basis of the experiments. Jurjevich (53) studied the teaching methods, the opportunities for learning experiences, and the outcomes of a three-year junior high-school core program; and he concluded that organizing learning experiences around broad problem areas results in academic and social achievement by students which is as good as, and in most instances better than, achievement in the more traditional organization.

Cornog (18) reported an experimental program associated with the title "School and College Admission with Advanced Standing." The program, initiated in 1951, was designed to revise the content and teaching in secondary schools to make more nearly adequate provision for the education of able youth. Revision was a result of the deliberations of 12 committees. The Committee on Individual Development directed its attention to the student himself; the other 11 dealt with subject matter. The experiment sought not simply to accelerate bright students but rather to provide a program that went beyond memorization. As evidence of acceptance of the program it was noted that 400 schools sent candidates to the May 1957 advanced placement examinations, and the program received endorsement by students, teachers, and parents.

Bissex (10) reported revision and extension of the Newton Plan, an effort to reorganize the curriculum for all subjects, grades 9 through 12. The plan involved experimenting with teaching large groups, giving teachers new roles in research and evaluation, and improving content.

The original phase was concerned with teaching traditional subjects in new ways. New content having the nature of general education offered types of knowledge, understanding, and appreciation usually not gained in regular classes. Exploratory evaluation of the program was provided by the Graduate School of Education of Harvard University after 1957. The evaluation procedure was carried on by researchers in residence who continuously appraised various aspects of the experiment and fed back information necessary to the program's growth. According to the report, outcomes in terms of learning by the students in the Newton Plan and by those in the more traditional program showed no essential differences.

Block-scheduling and core at the junior high-school level were described by Wright (98), who secured data from a survey of a 25-percent sample of 12,052 junior and junior-senior high schools in the United States. The major findings were that 19.3 percent of the sampled schools had block-time classes. This percentage increases to 31.4 percent if only junior high schools are considered; and within them the proportion increases inversely with the grade (94 percent in grade 7, 76 percent in grade 8, and 26 percent in grade 9). English and social studies were the subjects most frequently combined. In more than two-thirds of the schools, block-time classes had been introduced in 1950 or later. The report dealt at length with the procedures the responding schools used to develop core programs.

Jewett's (51) survey analyzed 285 courses of study from 44 states, the District of Columbia, the Canal Zone, and Hawaii. Showing changes which have occurred in the high-school English curriculum during the last quarter century, Jewett told how curriculum work was initiated, guidelines were observed, scope and sequence patterns were determined, provisions were made for individual differences, and promising practices in the language arts were suggested by courses of study. Among the significant changes he cited are: (a) inclusion of developmental reading instruction in many junior high schools, (b) heightened interest in world literature, (c) pupil guidance through speaking and writing, (d) emphasis on critical thinking, (e) determination of adequate scope and sequence, (f) articulation of all divisions of the school system from kindergarten through college, and (g) a concerted effort to instill appreciation of the privileges and obligations of living in a free, democratic society.

Content Areas in Secondary Education

The recommendations of several commissions and study groups reported earlier in this chapter, whose purpose was to establish content-organizing threads in selected subject areas from the kindergarten through grade 12, are expected to affect high-school programs. Several of these organized efforts were initiated at the secondary-school level. For example, the University of Maryland project (55) sought to determine the degree

of maturity required in students for certain mathematical concepts to be taught appropriately and to develop course materials for grades 7 and 8 consistent with their findings. The School Mathematics Study Group (9), which has shared instructional materials and personnel with the Maryland project, similarly advocated greater substance for seventh- and eighth-grade mathematics. Experimental units for these grades developed by the School Mathematics Study Group are being tested in approximately 100 classrooms. Other productions of the Group were materials for the self-improvement of teachers, textbooks for grades 9 through 12, and a series of mathematics monographs for students, teachers, and the educated lay public.

The University of Illinois Committee on School Mathematics (7, 75) sought to establish the unity of mathematics from the first grade through high school, introducing concepts now taught separately as arithmetic, algebra, geometry, trigonometry, and even calculus, appropriately, without regard to age or grade. The high-school program is presently in the developmental stage.

These and similar projects aimed to establish a balance among knowledges, skills, and values, with attention to continuity, sequence, and correlation. They should result in significant revisions of mathematics curriculums in public schools.

The initial emphasis of the Biological Sciences Curriculum Study reported by Grobman (45) was focused at the high-school level and sought to determine what knowledge of the life sciences a citizen should possess upon graduation from high school to understand his world. Land (60), appealing for establishment of functional biology in the secondary-school curriculum, considered fundamental physical principles and descriptions of chemical properties in tenth-grade general biology as keys to popular scientific appreciation, as well as to individual initiative.

The report of the Survey of Physiological Science presented by Gerard (38) emphasized the status and future of physiology as a basic aspect of biological science. The impact of physiology on the national welfare is emphasized along with recommendations for research and teaching. Stanley, Broudy, and Burnett (86) appraised science programs in Illinois secondary schools and made specific recommendations for improvement. The study, which relied upon the quantitative data available from records and from earlier and more definitive studies, dealt more with placement of the various disciplines by grade levels than with specific opportunities for learning.

The central objective of the Physical Science Study as reported by Little (63) was development of courses consistent with what physicists meet in practice. Basic assumptions were: (a) revision of subject matter should be made by practicing specialists; (b) high-school teachers can successfully teach subject matter beyond what they studied in college; and (c) high-school students will respond to intellectual presentation of

subject matter in which rational thought and analysis are more important than memory.

Dooley (23) reported a study involving the compilation and validation of geographic concepts for inclusion in curriculums, grades 1 through 12. A list of 218 concepts compiled from nationally used textbooks in geography and social studies and from randomly chosen curriculum guides was submitted to three juries made up of professors of geography and social studies and professional geographers; they rated them on accuracy, importance in general education, and learnability. The combined juries placed 49 percent of the concepts in grades 1 through 6 and 51 percent in grades 7 through 12.

Curriculum Decisions in Higher Education

The phenomena of foundation support and space-age insecurity gave rise to a number of curriculum demonstrations and studies in higher education. The buttressing of liberal arts subject matter in undergraduate and graduate programs, as well as in professional schools, underlay most curriculum decisions in higher education. Other purposes included (a) further clarification of the relationships between theory and practice in teacher education, (b) refinement and enhancement of professional programs, (c) advancement of interinstitutional co-operation, (d) extension of foreign travel and study, and (e) improvement in teaching methods and conservation of college teaching resources.

General Education

Centers or institutes of higher education were established at several institutions. Among them were: Teachers College, Columbia University; the University of California, Berkeley; University of Michigan; and Michigan State University. Reports from Columbia University (25, 65) raised provocative questions for curriculum decision-making. A survey of faculty attitudes and opinions in eight types of specialized schools brought forth the following issues: (a) the need to determine the best distribution of liberal arts courses through the four undergraduate years, (b) the need to clarify the concept of liberal education among faculties —and the lack of willingness to make contributions to this concept, and (c) the need to make explicit the broad purposes of liberal arts and to reorganize in terms of those purposes. A summary statement (65) called for a liberal arts curriculum for technical and professional students which is more than a direct contribution to specialized training.

Greater emphasis on liberal arts was reflected in undergraduate programs of general education, in graduate schools, and in colleges of education. The Ford Foundation (33) supported programs stressing liberal

arts in general education through curriculum innovations which included (a) combined subject courses in basic areas; (b) emphasis upon independent study, inquiry, and initiative; (c) improved utilization of resources through the use of teaching teams, co-operative teaching, and teaching machines; and (d) variations and flexibility in class sizes and scheduling of the college day, week, and year.

Wayne State University inaugurated its new Monteith College (68) designed to foster qualities of the wise citizen, the cultivated human being, and the competent and creative specialist. Though this program attempted to satisfy such criteria for curriculum decision-making as concern for organizing threads and the learning process, its emphasis on the Western World overlooked today's critical need for development of world-wide understanding.

The Carnegie Corporation of New York (14) supported programs to enlarge the role of liberal arts, among them (a) the degree of Doctor of Philosophy in liberal arts for students planning to be undergraduate teachers, (b) a series of courses designed to permit graduate students to sample fields of knowledge outside their own specialties, and (c) intensive exploration of single ideas or concepts in general education. Aside from the introduction of so-called discussion courses, the major emphasis was given to updating of program aims, especially those concerned with "considerations about contemporary society and the particular community for which the curriculum is planned."

The Fund for the Advancement of Education (35) reported 62 grants to 48 institutions to develop plans for more effective use of teaching resources. Independent study figured prominently among these programs. Allen (1) surveyed 170 economics education faculties who reported interested departures from traditional lecture methods.

Curriculum Study in the Professions

The largest grants from foundations went to teacher-preparation institutions. Program innovations in teacher education (33) included (a) paid internships, (b) near-obliteration of "methods courses," (c) use of teaching teams, (d) interinstitutional co-operation, and (e) reorganization of the content of education courses. Woodring's report (97) probably had as great an effect upon teacher education as Conant's report (17) had on the American high school. Woodring concluded that programs supported by the Fund for the Advancement of Education (a) created interest in problems of teacher education, (b) supplied teachers who would not otherwise have entered the profession, (c) surmounted barriers to changes in teacher education, and (d) brought together professional educators and liberal arts faculties.

Fifth-year internships have been an important and usually a preconceived condition of Ford programs, as indicated, for example, in Spaulding

and Krathwohl's (85) excellent but *ex post facto* evaluation of the Arkansas Experiment in Teacher Education. A prolonged internship involved three kinds of learning activities: (a) observation periods, (b) structured course work, and (c) evaluation seminars. Although the evaluation procedures were not systematic, they resulted in some observable program modifications.

While pressure increased for more liberal arts in teacher education, there was evidence that teachers colleges were doing about as well in this direction as liberal arts colleges. Andrews and Palmer (4), surveying 22 institutions in 19 states, observed that elementary-school teachers are required to complete courses of study similar to those in most liberal arts institutions. A parallel study by Cogan (15) of the requirements for secondary-school teachers brought forth similar findings.

Interesting curriculum experiments emerged from continued interest in the oldest of teacher-education problems—the relationship between theory and practice. Colvin (16) developed a series of direct experiences prior to student teaching, enabling student teachers to increase their readiness for supervised teaching. Direct experiences were explored to discover problems and formulate hypotheses to be tested. Dunham (26), using the Minnesota Teacher Attitude Inventory, determined that negative changes in attitude toward youth occur among student teachers during student teaching. Hansen (47) concluded from the results of an action research study of post-degree candidates for teacher certification that "direct experiences can be meaningfully related to theory if cooperative planning occurs." In a study of the timing of methods courses, Nagle (70), using his own tests, showed that integration of methods courses with a six-week period of full-time student teaching is more effective than part-time student teaching preceded by methods courses. Beckman (8) and Miller (67) reported the results of action research and group interaction in recognizing and solving teaching difficulties.

Refinement of graduate and professional programs took place in nursing education and medicine. Sand and Belcher (82) described the tasks and processes used to improve a curriculum in a collegiate school of nursing. Tschudin, Belcher, and Nedelsky (90) showed how faculty members of a school of nursing acquired skill in complex techniques of evaluation. Turner (91) reported a new medical curriculum at Johns Hopkins University which, through reconstitution of courses and rotating internships, resulted in an over-all timesaving of two years.

Studies and programs most significant to curriculum planners were those which fully explored a single curriculum component or showed clearly defined relationships between two or more components. Studies (82, 90) reported above cut across components and delved deeply into individual components. Three studies dealt in depth with data relating strongly to one curriculum component. Morris (69) showed the need for standardization of reporting of accreditation data among professional

teacher-education accrediting associations and their members. Powell (77), studying records of students admitted to college conditionally, found justification for providing educational opportunities for younger students with "borderline" credentials. Lloyd (64) conducted a study in depth of one post-degree certification program analyzing the learning experiences of the students. The study contributed several important hypotheses to be tested, and it implemented changes in other teacher-education programs.

In addition to these valuable sources of data and guides to curriculum planning in higher education, there were two important pronouncements upon the fixing of responsibility for curriculum improvement. Ruml and Morrison (79) showed that college trustees may legitimately concern themselves with more than the economic and financial material relating to curriculum. Issues considered of decisive interest to trustees were (a) remedial courses, (b) science offerings, (c) languages, and (d) a mechanism for determining curriculum design and administration acceptable to faculty, administration, and trustees. Lieberman (61), taking a different point of view, recommended that the choice of teaching methods and media, as well as the means of education, be left to one giant teacher organization. Lieberman's thesis was that local control of education has outlived its usefulness and that such control prevents enlightened decisions on policy, including curriculum policy.

Conclusion

Curriculum theory, though admittedly inadequate, has suggested sources of data to consider in making a wise choice of objectives and in determining appropriate means for their attainment. During these last three years there has been an apparent trend toward emphasis on the definition of the content aspects of objectives. Research and experimentation are needed to define the behavioral aspects of objectives and to show ways to take into account the uniqueness of individuals, communities, and educational institutions.

The heart of an educational program is the learning experiences of the students. What they do, what they think about, what they say and write, what they feel—these determine what they learn. Needed in curriculum theory are models that identify the various components of learning situations to which students may be expected to respond productively. A practical problem is that of bringing the various components of the curriculum together through the setting up of organizing centers for learning. Goodlad (40, 41) suggests three dimensions to be used in accomplishing this synthesis—learners, content, and organizing elements. The studies reported here reveal the need for more definitive research in curriculum organization.

The greatest effort needed is in the area of curriculum theory to "identify the major questions to be answered in developing any instructional program, to reveal the elements that tie these questions together in a system and the elements that separate questions from one another, to identify subordinate questions and classify them properly in relation to major questions, to reveal appropriate data-sources, and to suggest the relevance of data extracted from these sources" (39).

If the curriculum in American schools and colleges is to move from a melange of disaggregate parts, and if decision-making is to become scientific, major efforts in the decade ahead must focus on the formulation of a theoretical structure which will guide the design of meaningful research studies.

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CHAPTER IV

Teaching

ARNO A. BELLACK and DWAYNE HUEBNER

A CHAPTER on teaching in an issue of the REVIEW devoted to curriculum planning and development is justified more by theoretical need than by the existence of research which can clearly be categorized under the label, "teaching." Educators turn to many other categories which pull together information and ideas related to teaching. In recent REVIEW issues, Ellis (14) examined writings dealing with instructional procedures in secondary schools, and Leavitt (33) reviewed the literature on teacher-pupil relationships in elementary schools. In the third edition of the *Encyclopedia of Educational Research*, writings related to teaching were summarized by Stiles (55) under "Instruction" and by Wingo (63) under "Methods of Teaching."

In summarizing literature on different aspects of the same phenomena, Barr and Jones (3) stated that the primary factors of teaching have been ignored and that only surface aspects have been studied. This opinion is not uncommon today. Dodes (12), reviewing studies from 1900-1955 in order to suggest measures for solidifying the background of pedagogical knowledge, concluded that the dearth of scientific evidence is the result, in part, of ready acceptance of mere opinion and of a lack of clarity in terminology. The need to study teacher behavior in a context of theory was emphasized by Ryans (47), and it is this recurring theme which justifies inclusion of a chapter on teaching in this issue of the REVIEW.

Whatever schools do or are expected to do, most educators would agree that teachers are expected to, and do, teach. Of all researchers in education, those who claim the curriculum as their field of inquiry presumably have the greatest interest in teaching. One would assume, therefore, that curriculum research would focus major attention on teaching in order to understand it and thereby gain greater control over it. However, teaching has seldom been studied by curriculum researchers as a social or educational phenomenon in its own terms. For example, the comprehensive review of 25 years of educational research (1) published in 1956 reported not one study focused directly on teaching.

During the three-year period of this review, researchers have continued to study (a) effectiveness of teaching and prediction of teacher success, (b) teacher-student relationships, and (c) methods and styles of teaching. There is, however, a growing interest in the study of teaching as such.

In addition to researches grouped under the three categories listed above, this chapter also reports, in the section entitled "Concepts of Teaching," studies which have been developed along the lines suggested in the preceding paragraph.

Effectiveness of Teaching and Prediction of Teaching Success

The recent review by Barr and Jones (3) and the critical analyses of the progress and problems of research related to teacher effectiveness by Mitzel (36) and Ryans (40) make unnecessary extensive review of that subject matter here. However, the focus of this chapter warrants some discussion of the implications of the research for the study of teaching.

Research in teacher effectiveness has frequently bypassed the fundamental problem of identifying or conceptualizing the teaching process. Describing teaching was treated as ancillary to the value problem of identifying the criteria of teacher effectiveness. Predictors have been identified in terms of ease of measurement or common-sense relation to the criteria. The obvious link between criterion and predictor, the teaching act, has been ignored or relegated to secondary importance. Using Mitzel's (36) terms, if process criteria are used rather than product or presage criteria, then the researcher might focus on some aspects of the teaching act; but all too frequently these aspects have not been made to compose a systematic description or theory of teaching. Consequently, each researcher has been inclined to conceptualize aspects of the process in terms of his own research needs or competencies, and not in terms of the profession's need for continual refinement and systematization of the concepts used to grasp the components of teaching.

Cogan (8, 9) illustrated this tendency. By categorizing teacher behavior as inclusive, preclusive, and conjunctive, he added to the store of concepts used for this purpose—which already includes such well-known concepts as authoritarian, democratic, teacher-centered, and integrative behavior. Although he contributed to the solution of the criterion problem by proposing measures of required and self-initiated student work, he contributed little toward a stricter conceptual structure for viewing teaching. In fairness, this probably was not Cogan's intent; yet it would seem that all researchers who try to structure the teaching act conceptually should also seek to contribute to the development of better theories of teaching.

Teacher-Student Relationship

Many researchers continue to focus on the relationship between teacher and pupils in an effort to identify theoretical tools which will facilitate more intensive analysis of teaching with greater cumulative effect. In a

controlled study of 74 secondary-school teachers. Page (40) found that free comments on the students' objective test papers resulted in higher test scores on future tests than limited, controlled comments. By controlled testing of six different approaches, Torrance and Mason (58) concluded that factual, low-pressure techniques were more effective in influencing air crewmen than techniques which depended on persuasiveness or example-setting.

Kounin and Gump (31) studied the techniques of kindergarten teachers in disciplining individual children and the spread of effects to other children. The dimensions of discipline that they investigated were clarity of directions, firmness, and roughness; and the dimensions of pupil behavior investigated were lack of reaction, behavior disruption, conformance, and nonconformance. Clarity of the teacher's direction was related to increased conformance, and roughness to increased behavior disruption, but firmness had no predictable influence on audience children.

Investigators focused on several factors as they moved from descriptive studies of classroom behavior to those which attempted to uncover possible causal factors in teacher-pupil relationships. Gage (17) summarized a number of studies related to teacher perception of students, in which teachers predicted or estimated certain responses of the pupils. In general, he found that the correlation between the accuracy of the teacher's perception and his effectiveness, as rated by the pupils, did not differ significantly from zero. The studies were grounded in a theoretical structure, perception being one element; hence, the findings could help refine the theoretical framework.

Evidence obtained by Gronlund and Whitney (22) indicated that teachers who accurately judged the sociometric status of children were also accurate in judging intelligence. It would be helpful if Gronlund and Whitney's data could be related to Gage's findings. Beilin and Werner (5) found that, of 39 high-school teachers, men and women frequently used different criteria to select from questionnaire results the students best adjusted and most poorly adjusted. Smitter (53) reported a lack of relationship between teachers' apparent knowledge of the causes of children's misbehavior and the kinds of punishment they would use.

Several researchers focused on the values and attitudes of teachers as possible predictors of teacher-student relationships. Battle (4) was able to show that the degree of similarity between the pupil's value pattern and the teacher's ideal value pattern was related to the teacher's estimate of pupil achievement. Bowie (6) uncovered evidence that the teacher's verbal behavior in the classroom was influenced by his value patterns as identified by the *Allport-Vernon-Lindzey Value Scale*. She categorized the teacher's verbal behavior in terms of role-taking processes (feeling tone) and ideational content (ideas expressed), which implied a theoretical structuring of teaching. If she had contrasted this structure with other theoretical statements, she also would have contributed to the de-

velopment of a theory of teaching. In another study of the verbal behavior of teachers, Ravitz (44) found support for his hypothesis that teachers' verbal behavior reflected their concern for self or for students, as identified by a semantic differential inventory.

Three other studies attempted to relate teacher-pupil rapport to other personality indices. Dodge and Clifton (13), using student teachers as subjects, found middle-range correlations between their scores on a teacher-pupil rapport scale and on peers' ratings of social characteristics, professors' estimates of teaching ability, and cumulative grade averages. Sheldon, Coale, and Copple (48) reported that students scoring high on the *Minnesota Teacher Attitude Inventory* and on four scales of the *Minnesota Multiphasic Personality Inventory* differed significantly from low-scoring students in intelligence, authoritarianism, and certain manifest and latent needs. Rabinowitz and Rosenbaum (43) were unable to predict the teacher-pupil rapport of first-year teachers, as measured by a pupil inventory, from test data obtained in their senior year of college.

An idea expressed by Williams (62), Washburne (60), and Gordon (20) would seem to hold much promise for a different attack on the problem of student-teacher rapport. All three believed the relationship between teacher and student to be influenced by the tension between the institutional role of the teacher, as determined, for instance, by the principal, and the personal role that the teacher has developed. To cast the teacher-pupil relationship into a sociological framework of reference groups and role conflict might produce fruitful conceptions of the teaching act.

Interpretation of studies is also handicapped by the lack of adequate theorizing about teaching. Lack of a framework leads to difficulty in organizing or comparing. Without conscious attention to the theoretical structure of empirical studies, researches in teaching cannot be cumulative and build on their predecessors, except to refine techniques and method.

Methods and Styles of Teaching

During recent decades the most common approach to the study of teaching has been comparison of contrasting methods, usually identified as "teacher-centered" versus "student-centered" or "authoritarian" versus "democratic." Several studies which followed this direction were reported. Krumboltz and Farquhar (32) investigated achievement and motivational outcomes associated with the traditional instructor-centered and student-centered teaching procedures. They also included an "eclectic" procedure, a combination of the two extremes, which included student participation with instructor-led discussions and lectures. Results tended to show that students taught by eclectic methods were most highly motivated.

Novak (38), investigating "project-centered" and "lecture" methods used in teaching college biology, found that the project-centered methods

provided better for individual differences. Thompson and Tom (57), studying the effectiveness of pupil-centered versus teacher-centered patterns in teaching vocational agriculture, observed the pupil-centered method to be superior in some respects to the conventional, teacher-centered approach, and in no respects inferior to it. Haigh and Schmidt (23) demonstrated that for college students permitted to choose either teacher-centered or "group-centered" classes in psychology there were no significant differences in subject matter learned. Palmer and Verner (41) examined lecture, discussion, and lecture-discussion methods of class instruction in adult-education classes. In a review of the applications of research in social psychology to teaching, McNeil (35) interestingly described the characteristics of two imaginary schools, one of which embodied the findings of nondirective principles and the other of directive principles.

Three investigations were reported which dealt with teaching procedures associated with "directed" and "independent" discovery in learning. Kittell's (30) study demonstrated that groups given an intermediate amount of direction, in the form of underlying principles, retained and transferred more than groups given less or more direction. Craig (10) reported that increased direction of discovery activities effects increases in learning without accompanying losses in retention or transfer. Kersh (29) showed that the superiority of independent-discovery procedures of learning over procedures with "external direction" was to be explained in terms of increased student motivation rather than of the "meaningfulness" of the learning.

"Large-group" versus "small-group" instructional procedures were also the focus of attention. Nachman and Opochinsky (37) compared the achievement, as measured by examination performance, of college students in a small class with a matched group of students in a large class. Results showed that students in the small class made higher scores on quizzes that specifically covered material presented in the classroom and not prepared by the students, but that the two groups did equally well on final examinations for which they had studied.

Siegel, Macomber, and Adams (49) reported an extensive study which compared the learning outcomes of large-group and small-group instruction on the college level. Achievement of students as measured by final examinations was as good in large groups as in small. Students with high ability performed equally well on tests regardless of instructional procedures, whereas students with low ability occasionally suffered by assignment to a large class. Test results in critical thinking and attitude change did not consistently favor the experimental large-group instruction. Students in experimental (large-group) sections tended to rate their instructors and courses somewhat less favorably than students in control (small-group) sections. McKenna (34) reviewed the research on class size conducted by a research institute at Columbia University over a 15-

year period and observed that there is no one arbitrary class size that can be defended for all school systems or for all levels.

Two significant critical analyses of research dealing with contrasting teaching approaches appeared. Anderson (2), examining 49 experimental studies in which "authoritarian" leadership was compared with "democratic" leadership on the basis of productivity and morale, found evidence lacking to show that either type of leadership is consistently associated with high productivity. In the educational setting, morale appears to be higher under learner-directed conditions, at least when anxiety over grades is reduced. Anderson saw four factors as contributing to make findings confused and contradictory: (a) lack of methodological rigor and inadequate research design, (b) lack of familiarity with other research, (c) lack of precision in operational definitions of leadership styles, and (d) low level of empiricism of research undertaken. Explaining the significance of the last factor, Anderson observed that teacher-centered and learner-centered methods have been repeatedly investigated not with a view to determining *how* one would lead to superior learning, but merely with a view to finding out *if* one style is superior. He concluded that the authoritarian-democratic construct provides an inadequate conceptualization of leadership behavior.

Oliver (39) traced the history of the "unit" concept in social studies teaching and reviewed its effectiveness in contrast to the traditional "assignment-recitation" approach. With factual retention as the outcome measured, he found that research results revealed no striking evidence of superiority of the unit method. His extensive review of the theory and practice led him to question whether the unit concept is useful. He urged careful tests of teaching procedures premised on a theory of how thinking is developed.

All the above studies have something of importance to say about instructional techniques, but they are most meaningful as providing data about specific aspects of teaching or as helping a reader form his own concept of teaching. The isolated study remains isolated unless it is tied to other studies by a practical field problem, or unless it is seen in relationship to other studies by means of some theoretical framework.

Concepts of Teaching

Other studies focused attention directly on the processes of teaching, and the roles, functions, and behavior of teachers. Approaches varied widely: some authors drew implications for teaching from research and speculation in psychology, philosophy, and sociology; some developed relationships between teaching and therapy; some studied teaching in its own terms, rather than as derivative of other fields. Few studies were experimental; mainly they emphasized the development of conceptual

(theoretical) frameworks within which experimental investigations may proceed.

Psychology has long been a significant source of ideas about teaching. Fleming (15) set forth a view based largely on findings of psychological research. She identified six functions of the teacher: she identified the teacher as student of motivation, promoter of learning, observer of growth, craftsman and technician, experimenter, and administrator and therapist. Burton (7) proposed a set of principles of teaching consisting of inferences drawn from principles of learning. Hively (26) discussed the implications of Skinner's reinforcement theory of learning for the development of teaching machines.

The recent publication of the papers delivered at the Conference on the Art and Science of Automatic Teaching of Verbal and Symbolic Skills (18) called increased attention to the theory of teaching and the interrelationships among diverse studies; for, as Galanter states (19), teaching machines "are a theory of teaching." The problems of programing, pacing, prompting, and reinforcement are problems common to all teachers, although perhaps not conceived in the same way. The technical demands involved in producing and using teaching machines should certainly force the curriculum and teaching theorist to a more careful dissection of the teaching act. An inclusive annotated bibliography on teaching machines was compiled by Fry, Bryan, and Rigney (16).

Relationships between teaching and therapy were discussed by four authors. In Rogers' (45) view, a teacher cannot "teach" a learner new concepts and responses; rather, the best teaching emerges from a teacher-learner relationship in which the former is accepting and permissive and the latter makes relevant discoveries himself. Stovsky (56) presented the psychotherapeutic view that teaching is basically an interpersonal relationship whose purpose is control or reduction of anxiety and that it thus promotes learning.

Watson (61) saw a close relationshp between therapy and teaching. He conceived teaching as the organization of interpersonal interactions in groups to convey meanings that meet personal needs and interests. In his view, individual tutoring is "therapy," and all forms of group treatment are "teaching." Tyler (59) discussed five basic concepts of psychoanalytic theory and practice that have values for the theory and practice of teaching: the unconscious, the instincts, repression, structure of mental apparatus, and development of personality.

Views of teaching evolved from logic and theory of knowledge were developed by four authors. Henderson (25) identified two basic forms of knowledge, "know-how" and "know-that," which are the concern of teachers, and he made proposals for the preparation of teachers in the logical foundations of their work. Smith (51) explored the relevance of logic to thinking and teaching and proposed that "educational logic" should be a part of teacher preparation. He contended that the reduction

of thinking to psychological processes has left teachers without an adequate criterion for disciplined reasoning. Cunningham (11) identified communication as the key in teacher-student relationships, and language as the major communicative device. He proposed, therefore, that the teacher must understand the logical characteristics of language if he is to be effective. Plochmann (42) analyzed the logic of the process of communication in teaching systems of knowledge, particularly the problems of breaking down the systems for transmission and resynthesizing them in the mind of the learner.

The sociological concept of "role" has become useful in viewing the functions of the teacher. Havighurst and Neugarten (24) interpreted the teacher's role as composite of several sub-roles in relation to students: mediator of learning, disciplinarian, parent-substitute, judge, confidant, and surrogate of middle-class morality. Grambs (21) distinguished two categories of the teacher's role: director of learning and mediator of the culture. Spindler (54) viewed the teaching role as that of cultural transmission with special attention to the transmission of patterned conflicts in values.

Huebner (27) developed a conceptual scheme designed to facilitate understanding of the relationship between action in the elementary-school classroom and the educational outcomes of such action. Stressing the need for conceptual consistency, he attempted to use concepts derived from a unified behavioral theory to look at classroom action and educational outcomes. He suggested certain classroom actions that might best serve as focal points for observation in order to predict outcomes.

Experimental investigations dealing with the teaching process were carried forward by Smith and others (50, 52) and Hughes and others (28). Smith reported results of the first phase of a five-year investigation into the logic of teaching in secondary schools. His search for the logical structure of teaching took the form of a study in natural history; it was classificatory and descriptive. The authors contended that this is a stage of investigation which must be worked out before teaching can be understood in its own right, rather than as a system of principles and practices supposedly derived from philosophy and psychology; they believed that they clearly established the existence of logical operations in teaching and that some of these operations are significantly more prevalent than others, notably those of *describing*, *designating*, and *explaining*, in that order. With respect to logical operations within the various subject fields, the conclusion tentatively reached was that differences may exist among teachers and among fields in the extent to which the logical operations are employed.

Hughes and others (28) reported a study with a twofold purpose: development of (a) a definition of good teaching and (b) means for assessment of the quality of teaching. Teaching was defined as "the interaction of teacher with child or group." Basic data were specimen records

of the behavior of 41 teachers in three states, all of whom were judged to be "good" teachers by administrators or supervisors. Through the study of the data gathered, 31 teaching functions were identified and organized in seven categories: controlling function, imposition of teacher, facilitating function, functions that develop content, functions that serve as response, functions of positive affectivity, and functions of negative affectivity. The most frequent and pervasive functions performed by teachers were in the category of *controlling*. For most teachers the acts of control were well over 40 percent of all teaching acts. The consequences of the categorized functions were examined in terms of authors' view of desirable objectives of education, and a model of "good" teaching was proposed in the light of responses required by teachers to fulfill these objectives.

Conclusions

Review of the last three years' research supports the contention that recent modes of inquiry have not been very fruitful. New approaches are called for. The study of teaching in its own terms as illustrated by the writings cited in the last section is a promising approach. Smith (50) has stated this well: "Teaching is a natural phenomenon related to the cultural survival of a people, as reproduction is related to their cultural survival. Teaching has its own forms, its own constituent elements, its own problems and its own regularities. It takes place under a stable set of conditions—time limits, authority figures, limited ability of students, institutional structures, etc. All these considerations support the conclusion that teaching is to be studied in its own right if we would understand it and thereby gain control over it."

The researcher who is interested in the testing, refinement, and development of new concepts and theoretical systems has a life's work. The phenomena of teaching are there to be described and analyzed. From such efforts, explanatory and predictive theory is possible. But to develop such theory, the "conventional wisdom" of the educator and the educational researcher must be challenged. This is the function of research. Too few of the studies referred to here move from empirical data to an evaluation of the concepts used to organize these data.

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CHAPTER V

Administrative Structure and Processes in Curriculum Development

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THEORIES AND concepts of curriculums come into operational being, are nurtured and, hopefully, improved through administrative processes and structures. This chapter reviews the literature of the last three years bearing on the relation between these administrative structures and their processes, and the curriculum. It is organized into four major categories: (a) supervisory and administrative roles, (b) patterns of inservice education, (c) physical facilities and instructional materials, and (d) school structure and organization.

Supervisory and Administrative Roles in Curriculum Development

Cammarota (26), Clark (31), Jensen (60), Krug (67), and the Association for Supervision and Curriculum Development 1960 Yearbook (10) indicate that the all-encompassing role of the administrator as a leader in curriculum development must be developed without challenging or deterring the leadership function of members of the staff. Dutton and Hockett (38) and McSwain (75) propose that the principal's essential leadership function is to promote co-operative action on curriculum, not only within the school staff, but also in the school community.

Frazier, in (11), saw leadership as composed of functions necessary to group maintenance and to furtherance of group purposes, but did not delineate the component parts and their relationships to curriculum. Grant (49) recognized the principal's function as a leader, but observed that few curriculum or instructional changes result from staff work except as there have been changes in the values, understandings, and skills of teachers. Grant's concept of leadership, though widely accepted, is not based on substantial research.

Arnheim (8), Cammarota (26), Frazier (11), Jensen (60), Krug (67), and Spalding (101), discussing the principal's role in curriculum development, stressed the importance of his understanding of people, skill in identifying and defining educational problems, and ability to develop procedures for solving problems and for evaluating plans of action.

*With the assistance of B. B. Brown, Raymond J. Husebo, Wayne L. Kuckhahn, Frank B. May, Wayne Otto, and Michael P. Thomas, Jr.

Wiles and Grobman (110) reviewed the Sugg study (103) of the operational roles of the principal as these roles are defined by the character of the principal's relationships with the individual teacher, the total staff, and the school community. Sugg found the faculty readier for curriculum change in the elementary school administered by a democratic principal than in the school where the status leader was not democratic. That no relationship was found in the secondary school between readiness for change and operational pattern was explained on the basis of the secondary-school department head's being more influential in dealing with instructional matters than the principal.

There were few studies of the role of the administrator in dealing with particular problems of curriculum. Jameson and Hicks (59) observed use of the same procedures to deal with specific instructional problems as with problems of over-all curriculum improvement. Arnheim (8) saw provision for equitable staff use of instructional materials as a principal's problem. Spalding (101) advocated broadening of the principal's responsibility to include all of the curriculum activities of a school, arguing that he is the one person concerned with all aspects of the educational program.

A critical problem not developed in the literature is that of dealing effectively with the overlapping responsibilities and roles of principals, supervisors, curriculum directors, and superintendents. The role of the supervisor in curriculum development is usually separated from administrative roles. Foster (42), studying 40 elementary supervisors and 50 teachers, observed that both perceived the role of the supervisor as having to do primarily with on-the-job training of teachers. Adams and Bowie (3), Clark (31), and Laing (68) saw supervision as concerned with improving the quality of all learning opportunities, and the supervisor's role as that of a service agent, not a line officer. Little evidence, however, was presented to buttress their propositions.

Inservice Education and Curriculum Development

Much curriculum development takes place in, or is the result of, inservice education. Writings dealt with techniques of inservice education, patterns of personnel involvement, organization of inservice work, work products (handbooks, resource units, and the like), evaluation of inservice programs, resources, and motivation of teacher participation.

Techniques of Inservice Education

Taylor (105), using a stratified, random, proportional sample of 100 public senior high schools in Indiana, observed the following techniques in secondary inservice programs: (a) pre- and post-sessions with pay

(found especially in large schools); (b) development of a professional library with a place for browsing; (c) regular faculty meetings during the school day; (d) teacher committees working with the board of education and the administration on salary schedules that reward teacher growth; (e) teacher committees making community surveys in connection with curriculum development; (f) faculty committees studying school problems, experimenting, and evaluating; (g) visiting of classes by teachers in their own schools or others; (h) special programs for induction of new teachers; (i) small-group study of the curriculum; and (j) provision for sabbatical leave. Taylor found a wide variation among schools in the use of these techniques.

Teachers in Idaho surveyed by Daines (35) indicated the workshop to be their preferred method of inservice education. Sims (99) found workshop technique considered by teachers in Topeka to be very useful for inservice growth in science. Applegate (7), surveying inservice programs of a 25-percent, stratified, random sample of Minnesota schools, found that over 60 percent had workshops in 1955 and 75 percent expected to have them in 1956. Despite Applegate's finding of increasing use of workshops, they were not rated highly by teachers. There was no evidence as to whether workshop experience produced significant change in the behavior of teachers.

Lonsdale and Marshall (72) observed a California method whereby a principal and a consultant work with an experienced teacher to prepare and develop a demonstration lesson which is followed by a faculty meeting to relate the reactions of observers to improved teaching practices. Hedges and others (55) described observations of curriculum practices in outstanding schools of other states by teachers and principals of Morehouse Parish, Louisiana.

Many curriculum workers and administrators have great confidence in university or college course work as an inservice device. Alexander (5), studying co-operation between Dade County and the University of Miami, reported the following patterns: summer workshops of two- or three-week duration; seminars for persons in specialized positions, e.g., the principal; practicums for entire faculties; practicums for supervisory teachers; after-school lecture series; and specialized campus courses offered on an inservice basis for Dade County personnel only.

In these reports, no information is given as to what effect the classes, visits, and demonstration programs had on the attitudes and understandings of participating teachers, or on the instructional practices and programs of the schools involved.

Patterns of Personnel Involvement

Berge, Harris, and Walden (18) found three major patterns of personnel involvement in inservice programs: (a) centralized approach—

curriculum development by the central office; (b) decentralized approach—curriculum development by the school staff; and (c) centrally co-ordinated approach—central staff aid to teachers. The researchers, using guidelines suggested by Parker (89), rated the centrally co-ordinated approach highest.

The importance of the role of teachers in the selection of problems for study was observed by Daines (35), Taylor (104), and Krebs (66). Daines reported disagreement between administrators and teachers in Idaho as to what problems were important to study in an inservice project.

The use of consultants in programs of inservice education is a widespread pattern. Richardson (94) described the use of college and university staffs to help school districts in New Jersey improve their science programs. Alexander (5) believed that an effective inservice program can be fostered by co-operation between public-school consultants and those from university faculties.

Taylor (105) observed the absence in an Indiana sample of lay co-operation in curriculum development, but Bienvenu (21) reported utilization of lay people in 12 school systems co-operating directly with the Joint Council on Economic Education. Lay participation was described in Ayars' evaluation (13) of five community resources workshops. Berge, Harris, and Walden (18) showed that school systems using the centrally co-ordinated approach to inservice education made frequent use of lay people.

In the literature concerning the patterns of personnel involvement, however, many problems seem not to be recognized: the effect of curriculum problems on personnel structure; the nature and purpose of educational decisions, and authority for such decisions; and the effectiveness of alternative staff organizations for curriculum work.

Problem Areas for Organizing Inservice Education

Daines (35) stated five problems most often selected by teachers for inservice study: (a) providing for slow learners; (b) providing for fast learners; (c) providing for children with behavior problems; (d) developing skills for independent word attack at different reading levels; (e) developing the feeling of confidence, security, and belonging in children. Brandt and Perkins (22) reported that the teachers' participation in child-study programs of the University of Maryland's Institute of Child Study did not affect their pupils' reading and arithmetic achievements, but resulted in more positive ways of working with children and more democratic classroom organization.

Alexander (5), Weiss (108), and Nelson (84) reported interest in child study in inservice programs. Nelson (84) also reported attention in inservice programs in California to supervision and co-ordination, serv-

ices to secondary schools, kindergarten programs, outdoor education, evaluation of instructional materials, and all the subject areas. Berge, Harris, and Walden (18), however, found that when individual school groups determined their own plans of action, they stressed child study, guidance, and human relations most frequently, although most of the subject-matter areas received some attention.

Work Products

Applegate (7) revealed that teachers' handbooks were prepared in about half of the sampled Minnesota schools; in 42 percent, the central office staffs prepared them. All teachers ranked preparation of the handbook among the top three of 25 selected inservice practices. Koch (64) reported that statements of city-wide educational philosophy, as well as local-school philosophy, were prepared in St. Paul. Berge, Harris, and Walden (18) showed that the development of teacher guides and courses of study, revision of reporting systems, and long-range planning of course offerings were staff enterprises which occurred frequently. Scope and sequence charts in economic education were developed or adapted from those produced by workshops in California, Indiana, and Ohio (21).

Nelson's examination (84) of California county inservice programs revealed a variety of such work products as the following: science exhibits; social studies skeleton units and directory of materials; music and art guide sheets, bulletins, festivals, and teacher aids. No appraisal of the value of these work products to meet teacher needs or to improve educational programs was reported.

Released Time and Use of Resources

Rehage and Denemark (92) observed four types of inservice programs in addition to those undertaken by local systems: area, state, regional, and national. In an area program in Michigan, for example, consultants were provided, but adequate time for teacher participation was not. The Illinois Curriculum Program provided both kinds of resources.

Physical Facilities and Instructional Materials

Few of the studies of physical facilities (a topic regularly discussed in the REVIEW issue devoted to "Administration") related directly to the curriculum. Belknap (16) used the 10 developmental tasks of children as a basis for planning the kindergarten room. His major observation was the need for flexibility of equipment and for varied use of space. Alexander (4), examining the ungraded school from the architect's point of view, stressed the importance of planning for flexibility and ease in dividing large groups.

Increasing attention was paid to design of classrooms for specific subject-matter areas. Bagby and Stickle (14) reported results of a survey on what is needed in an English classroom, and Carter (30) discussed facilities for music and drama. Ovard (88) surveyed planning of social studies facilities. Ireland (58) described a plan featuring workshops and "student action" rooms that permit students to develop particular interests or abilities. Brubaker and Perkins (24) advocated primary emphasis upon space designed to stimulate individual learning, discussing (a) "quest space" for individual study, (b) teacher studios, and (c) group spaces. LeCronier (71) described a school designed to fit a situation in which team-intern teaching was employed.

The writings reported here recognize that school-plant planning, as well as curriculum planning, must proceed from a carefully conceived idea of what the educational program ought to achieve. Once the purposes are clear, the physical facilities of the school must promote, rather than prescribe, the curriculum. Since purposes will undoubtedly change and since newer teaching methods will be devised, the keynote at present is flexibility.

Many suggestions were made for a center for instructional materials, and DeBernardis (37) proposed the following as the goals for use of such a center: It must (a) encourage teachers and pupils to use a variety of materials, (b) provide means for exchange of materials, (c) provide for effective storage and distribution, (d) provide inservice education facilities, (e) provide for production of materials, (f) provide inventory catalogs, (g) provide repair facilities, and (h) draw together related materials on any given topic. Carmony (29) believed that the library space can provide maximum preview and administrative service with minimum new-space requirements. Cypher (34) and Sattley (95), on the other hand, raised objections to the use of the school library as a general materials center.

Davidson (36), Hamilton (50), and Kosell (65) described methods of distribution of instructional materials. Evaluations of distribution techniques, however, are almost nonexistent in spite of the obvious relationship between distribution and utilization of materials.

Gillingham (45) tried to find a method of involving school personnel in the evaluation and selection of instructional materials. He approved the trend toward having the audio-visual staff advise committees of teachers who had major responsibility for evaluation and selection of audio-visual materials.

Preparation for Use of Instructional Materials

Benda (17) found that most teacher-training institutions have no established course of study in audio-visual instruction. Beginning teachers are thus without full awareness of the potential contributions of various

media. Such courses as were offered stressed operation of machinery rather than selection and proper utilization of materials. Camp (27) found a positive relationship between the teacher's use of audio-visual materials and his level of audio-visual training. These studies made clear that the presence of instructional materials does not ensure their intelligent use or, indeed, their use at all.

School Structure and Organization

Goodlad and Anderson (47) confirmed increasing use of the nongraded plan throughout the United States. Austin (12) gathered information on the nongraded primary unit, concerning its development, objectives, operations, professional staff, and public relations.

As the nongraded pattern found its way into new communities, variations in organization and structure developed, and individual plans were based on different emphases: continuous progression (39), division by reading levels (48), and provision for the gifted (91). Kluwe (63), investigating integration of the kindergarten and the primary programs, found that integration of the programs resulted in some statistically significant advantages to kindergarten children in better social adjustment and greater reading readiness.

Finley (40), working with a self-contained group of third-, fourth-, and fifth-grade children, found that, in this flexible grouping plan, the youngest benefited most in terms of academic achievement and that the growth of the older pupils was not impaired.

Hamilton and Rehwoldt (51, 93) reported on the multi-grade, multi-age plan in the Torrance Unified School District of California. This plan groups children varying three or four years in age and grade level at a primary level and at an intermediate level. A consistent pattern of gains greater than those of children in single-grade classes was observed in academic achievement, personal and social adjustment, and maturity and desirable behavior characteristics.

Bremer (23) found that first-grade reading-achievement scores were higher for high-readiness children who remained in regular heterogeneous classes than for high-readiness children who were segregated from low-readiness children. Martin (77), analyzing ability grouping in junior high schools, found little evidence that it materially benefited any of the segregated ability groups.

Morton (80) discussed successful heterogeneous grouping where homogeneous grouping is not feasible because of the size of the school. Wilhelms (111) described the flexible-open society that can exist where various grouping procedures are all used in the same single classroom. Crutcher and Smith (32) maintained that average-low, average-high grouping which avoids the disparity of most homogeneous plans provides for both successful academic learning and successful social learning.

Attention was given to the dual-progress plan, whereby the elementary student spends half days in graded classes of English and social studies, and half days in nongraded classes with specialized teachers. Pregler (90), Stoddard (102), and Wernick (109) reported such practices but gave no data regarding their results.

Concern for the gifted rekindled interest in reappraising grouping practices. In general, evaluations of pupil achievement in secondary schools and in specific subject areas tended to favor homogeneous rather than heterogeneous grouping. Gallant (44), Johnson and Shields (61), and Shapleigh (98) described grouping for the gifted at the high-school level, but made no evaluations. Hart (53), Smith (100), Wagner (107), and Wernick (109) reported improved accomplishment in reading, language arts, arithmetic, and science as a result of homogeneous grouping at the elementary-school level.

Gallagher (43), Hay (54), Lauchner and Horner (69), and Lawson (70) cautioned against accepting grouping uncritically and pointed out that homogeneous grouping for one subject area may actually extend the range of heterogeneity for another. Conclusions about grouping which have been reached on the basis of evaluation of one or two objectives may change when a broader range of objectives is considered—and physical rearrangements of pupils ought to be related to, or determined by, equally important rearrangements in curricular and instructional practices.

The literature described utilization of in-class enrichment practices for the gifted (1, 9); discussed academic segregation of the gifted (19, 52, 73, 91); and proposed programs of acceleration (56) and the utilization of the kinds of teaching procedures used in colleges (33). Many statewide (78) and city programs (28, 57) were in process of development. Bettelheim (20) observed, however, that the claims and counterclaims for segregated education are emotional rather than scientifically based.

Anderson (6) believed most gifted children need more than enrichment in regular classrooms, but Baldauf (15) showed that they make above-average gain when participating in enrichment programs. This suggests that the nature and quality of the enrichment program may be the important factor. Abramson (2) found that ability grouping for children of high ability had little or no effect on later academic achievement. Bettelheim (20) believed that removing gifted children from academic contact with others may create serious problems for them and for society. Mann (76), reporting greater acceptance and rejection among children within ability groups than across groups, found that children in heterogeneous groups showed greater range of friendships, both in and out of school. Goldworth (46), in a more limited study, found that segregation of the gifted in grades 4 through 8 had no effect on friendship patterns and group cohesion. Herminghaus (57) reported positive social effects for the segregation program. Crutcher and Smith (32), Wernick (109), and Yerg (112) reported similar results for average and slow-learning children.

Otto (87) pointed out that acceptance of individual differences forces concern for differentiated education and for changes in organization to deal with such differences. Most mechanical approaches to school and class organization deal with peripheral factors rather than with problems of instruction and necessary instructional resources. Thelen (106) believed grouping based on feelings, attitudes, ambitions, and relationships among children, plus appropriate instructional planning and teaching, far more likely to produce increased achievement than grouping designed for increased manageability of pupils or comfort of teachers.

The literature on the effects of grouping on the gifted was reviewed in a previous issue of the REVIEW (41).

Staff Utilization

During the period under review, the *Education Index* first employed the term "staff utilization" as a heading for classifying the rapidly increasing literature dealing with teaching teams and other experimental patterns of organizing the instructional staff. In two extensive surveys, the Commission on the Experimental Study of the Utilization of the Staff of the Secondary School (82, 83) brought together accounts, descriptions, and progress reports of a variety of studies. Although results of almost all were incomplete, there was an observable tendency for many to limit the scope of their inquiries to seeking ways to use nonprofessional personnel, audio-visual aids, modified schedules, and varying sizes of classes in order to free the time of teachers from noninstructional responsibilities or to make experienced teachers with special skills available to larger numbers of students. So far, attention has been centered on the administrative and mechanical aspects of staff reorganization and has not dealt with corollary matters of curriculum change.

Illustrative of promising staff utilization studies, a Texas project (83) sought to test the hypothesis that the teaching of large groups (using television, radio, tape recorders, and over-viewers) and teacher-pupil planning of learning experiences for individual and small-group effort in unit-type activities are more economical and more educationally productive than secondary-school teaching after the traditional pattern. In Weber County, Utah (82, 83), a curriculum of the core type was proposed as a more economical utilization of staff than the traditional type. An attempt to develop an instructional program suited to a uniquely designed high-school plant in Syosset, New York (82, 83), evolved five patterns of staff organization: (a) alternating teaching, (b) co-teaching, (c) master-teaching, (d) panel teaching, and (e) team teaching.

Unfortunately most of these programs have not progressed far enough for conclusions to be reached regarding the value of the several innovations. Even more unfortunate is the fact that many of them are but demonstrations of practice, lacking any design for evaluation. It is regrettable

that more effort is not made (a) to explore possibilities of curriculum organization and their relation to appropriate patterns of staff organization for implementation and (b) to extract maximum information and understanding from a staff utilization study by evaluation of important independent-dependent-variable relationships.

Core Organization

Noall and Winget (86) reported on core organization in Utah. Schwartz (97) observed that high-school students who participated in a core program in junior high school achieved higher final marks in grades 10, 11, and 12 than those who did not so participate. Mennes (79) found that students in double-period classes combining English and history made greater progress than students in separate single-period classes. (Additional references on core programs were cited in the REVIEW issue devoted to "Adolescence.")

Class Size

The study of class size and its effect upon achievement continued a popular theme. Johnson, Lobb, and Patterson (62) compared achievements of the following: (a) 20 students taught by one teacher and 35 taught by one teacher; (b) 70 students taught by two teachers as a team and 70 taught by two teachers in two classes of equal size; (c) 70 students taught by two teachers as a team and 20 taught by one teacher; and (d) 70 taught by two certified teachers as a team and 70 taught by one certified and one noncertified teacher as a team. No significant academic variance between and/or within the experimental classes of varying size was found.

Cammarosano and Santopolo (25) found that a college class of 60, assuming comparable teaching, equaled the achievement of a class of 30. Nelson (85), measuring the achievement of college students in elementary economics, found that, under identical conditions, classes of 85-140 can be taught as effectively as classes of 16-20.

Macomber and Siegel (74) found that instruction given simultaneously to large groups in either television sections or large classes is accomplished at some sacrifice of students' favorability to the course, even though there is virtually no measurable decline of achievement. Schellenberg (96) found a consistent inverse relationship between group size and student satisfaction; that instructors are more inclined than students to show satisfaction with large groups; and some evidence of slightly higher academic achievement in small groups than in large groups.

Nachman and Opochinsky (81) sought to discover why class size has been found repeatedly to produce no significant effect on the amount

learned. Their study tested the hypothesis that two groups taught under different procedures may learn different amounts in class but that, when both engage in significant extra study, the difference in performance on the final examination becomes negligible. Although this experiment was not primarily concerned with the effects of small versus large classes, the data indicated that students in small classes learned significantly more in class than did the students in large classes. The hypothesis that no difference would be found between the classes when the students were given an opportunity to study for an examination was also confirmed.

Summary

This review of the literature in administrative structure and processes in curriculum development reveals that:

1. The principal is expected to assume a leadership role in improving and developing the curriculum. The importance of his working style (democratic and co-operative), his capacity to enhance the leadership function of the staff in instructional improvement, his ability to do curriculum research, his skill in problem definition and problem-solving, his skill in evaluation processes, and his general ability to understand and work with people were all emphasized.

2. A wide array of working processes and problem areas has been utilized in programs of inservice education of teachers. The results of such studies indicate that attempts to deal experimentally with an aspect of the educational program, if carried on with enthusiasm and persistence, will be regarded by the participants as valuable and will produce an effect greater than that produced by the usual program of activities. In general, however, studies of problems closely related to significant areas of the educational program and its educational and social processes seem to be more effective than those less related. This suggests that sufficient knowledge has been gained to permit development of a tentative theoretical structure of staff work on curriculum problems, which would enable the systematic accumulation of further knowledge.

3. There is a significant attempt to relate improvements in physical facilities to concepts of educational organization and program. This effort is evidenced in building design, arrangements within educational units, and variation in classroom design to match the intended function. It may even be a fact that ingenuity in building and classroom planning has outstripped ingenuity in educational planning.

4. Attempts are being made to dispose large numbers of children, staff, and facilities in more economical and efficient ways to deal with large numbers of students, with variation in ability, and with limitations of teacher competency. Under the stimulus of foundation effort and public criticism, more activity is being evidenced in this area than at any other

time during many years. No clear trend has yet appeared in the studies under way.

This review of studies of administrative structure and its processes and of their findings brings four important research problems into focus:

1. Staff and administrative structure which actually exists in a school program is more complex in nature and function than is implied in the common conception of a principal and teachers operating more or less independently. There is need, therefore, to study staff and administration structures as social systems which involve principals, supervisors, teachers, children, and parents, and which operate as units within a larger system. Study of the roles of a principal without relation to other roles in the same structure, therefore, will only lead to the finding that the principal must be all-wise, responsible for all things, and competent to deal with all problems.

2. Administrative structures appropriate for budgeting, pupil accounting, building maintenance, determination of lines of authority, and the like may not be appropriate for improving the curriculum; yet, there is little recognition of the implications of a difference in structure for a principal when he moves from his role in the administrative structure to his leadership role in curriculum improvement.

3. The relationship among three classes of variables tends not to be recognized in studies of structure and processes in curriculum development—the variables having to do with variations in the behavior of staff personnel and changes in administrative structure; the variables having to do with changes in values, abilities, and understandings of the instructional personnel, and changes in the curriculum structure; and the variables related to the educational behavior of children and youth.

It seems obvious that all three of these classes of variables need to be related. Changes in administrative structure ought to be related to changes in teacher behavior, which ought in turn to be related to changes in the behavior of the learner. Perhaps the best we can do at present is to observe the relationship among variables in one or two classes, that is, how changes in the working style of the principal are related to staff acceptance of his leadership.

4. Those doing research on administrative processes in relation to curriculum structures lack a methodology adequate for dealing with the complexities of this problem. Unfortunately, few studies reviewed here fully utilize present knowledge.

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Index to Volume XXX, No. 3

Page citations are made to single pages; these are often the beginning of a chapter, section, or running discussion dealing with the topic.

Ability grouping: and academic achievement, 265
Acceleration: programs of, 265
Accreditation data: need for standardization of, 239
Achievement in core curriculum: academic and social, 234
Action research: curriculum project, evaluation of, 232; reports on, 239
Adjustment: teacher criterion of, 248
Administrative procedures: degree of diffusion of, 212
Administrative structure: and curriculum development, 258, 269
Administrator: role of, in curriculum development, 258
Adolescent peer groups: increasing influence of, 207
Adolescents: influence on, by peers and adults, 215
Advanced Placement Examination Program: description of, 234
Affective behavior: relation to intelligence, 192
American Legion: textbook analysis and criticism and citizenship education, 201
Anxiety: over grades, relation to teaching method, 251; reduction of, in teaching, 252
Arithmetic: comparison of European and American children in, 203
Articulation: of English curriculum, 235
Athletics, interscholastic: and scholastic attainment, 216
Attitudes: change of, by education, 217
Audio-visual instruction: course of study in, 263
Authoritarian teaching: effect of, 251; vs. democratic, 249
Automatic teaching: research on, 252

Biological sciences: new curriculums in, 228, 236
Block plan of school organization: evaluation of, 232
Block-scheduling, junior high: description of, 235
"Brainwashing": studies of, 217

Case study: of school in industrial city, 232
Centers of higher education: establishment of, 237
Child-guidance clinics: development of, 208
Child-study programs: effect on teachers' ways of working with children, 261; in inservice programs, 261
Citizen co-operation: in curriculum development, 261
Citizen groups: use to recommend school policy, 202
Citizens advisory committees: discussion of, 232
Citizenship education: and American Legion, 201
Class size: and effect on achievement, 267; research on, 250; variance in, and effect on curriculum, 234
Classrooms, design of: for specific subject-matter areas, 263
College admission: of borderline students, 240
College or university courses: as inservice training, 260
Communication: as key in teacher-student relationships, 253
Comprehensive high school: discussion of, 233
Computation: comparison of English and American students on, 204
Conformity: effect of discipline on, 248
Consultants, use of: in inservice education, 261
Content of education: determination of, 188
Coordinated Education Center: discussion of, 229
Core curriculum: in junior high school, description of, 235, study of, 234; use of, 266, 267
Counseling: youths' desires in, 208
Creativity: nature of, 218
Critical thinking: effect of large-group instruction on, 250; in junior high-school English curriculum, 235
Cultural transmission: through teaching, 253
Culture, student: study of, 215
Curriculum: components of, 226; definition of, 185; effect of social and psychological research on, 214; forces influencing, 199; influence of changes in family life on, 209; influence of changes in group life on, 211; influence of value changes on, 209; national, discussion of, 229, proposal for, 190; organization of, 240; scientists' influence on, 205; secondary, discussion of studies, 233; state of the field, 185; teacher involvement in planning, 192

Curriculum decision-making: at the societal level, 186; institutional-instructional levels of, 189
Curriculum development: administrative structure and processes in, 258; and in-service education, 259
Curriculum organization: patterns of, 231
Curriculum study programs: relation between teacher satisfaction with, and method used to develop, 193

Delinquency: increases in, 207, 208
Democratic teaching: effect of, 251; vs. authoritarian, 249
Democratically acting principals: and readiness for curriculum change, 259
Demonstration lesson: as inservice training, 260
Depersonalization: general social trends toward, 209
Desegregation: pressures on curriculum, 200
Developmental tasks: as basis for planning kindergarten room, 262
Dewey centennial: publications during, 187
Directions: effect of clarity of, on discipline, 248
Discipline: dimensions of, 248
Discovery activities: direction of, and effectiveness of learning, 250
Discovery method of teaching: studies of, 250
Discussion methods: comparison with other teaching methods, 250
Drama: facilities for, 263
Dual-progress plan: description of, 265

Economic education: scope and sequence charts in, 262
Economic philosophy: application to problems of the scientific age, 206
Educational philosophy, city-wide: statements, 262
Ego defenses: relation to attitudes, 217
Elementary education: curriculum decisions in, 230
Elementary school: nongraded, discussion of, 231; perception of, by public, 231
Elementary-school teachers: training in liberal arts, 239
English, classroom for teaching: needs of, 263
English curriculum: high-school, changes in, 235; in core classes, 235
Enrichment, in-class: utilization of, 265
European and American children: comparison in arithmetic, 203
Evaluation of education: pre and post Sputnik, 203
Example-setting: effects of, 248
Expenditure per pupil: and quality of education, 212

Family interaction patterns: and mental illness, 217
Family life, changes in: influence on curriculum, 209
Family-life courses: usefulness of, 210
Federal aid to education: history of struggle over, 200
Foreign educational practices: impact on American education, 202
Foundations, philanthropic: activities of, 226

General education: at high-school level, 235; college undergraduate programs of, 237
Geography curriculum: description of, 237; new approaches to, 193
Gifted: provision for, 264, 265
Grade, average student: relation to teacher-pupil rapport, 249
Grades: effect of anxiety over, 251; effect of removal of, 231; relation to student status and roles, 215
Group life: influence of changes in, on curriculum, 211
Group psychotherapy: use of, 252
Grouping: effects of flexible plan, 264; heterogeneous vs. homogeneous, 264

Heterogeneous vs. homogeneous grouping: effects of, 264
Higher education: curriculum decisions in, 237
History of science: teaching of, to understand the scientific age, 206

Imagination: nature of, 218
Inservice education: and curriculum development, 259; discussion of, 268; problem areas for study, effects of, 261; techniques of, 259
Instruction: of large groups, 250
Instructional materials: equitable staff use of, 259; evaluation and selection of, 263; methods of distribution of, 263; preparation for use of, 263
Instructional materials center: suggestions for, 263
Instructional procedures: research on, 246
Intercultural patterns: curriculum and instructional implications of, 201
Internships: fifth-year programs, 238
Iowa Tests of Basic Skills: Use to compare Dutch and American children, 204

Kindergarten: advantages of, 264
Kindergarten room: developmental tasks as a basis for planning, 262
Kindergarten-primary program, integrated: experimentation with, 231

Large schools: advantages and disadvantages of, 212

Large-group teaching: discussion of, 250; in Newton Plan, 234; new pattern of, 266
Lay co-operation: in curriculum development, 261
Leadership: in curriculum development, 258
Learning: and behavioral goals, 218; effect of direction in, 250
Learning, theory of: implications for teaching machines, 252
Lecture method of teaching: vs. project method, 249
Liberal arts: for teachers, 238; in teacher education, 239
Liberal arts curriculum: for technical and professional students, 237
Liberal arts subject matter: strengthening in programs, 237
Literature, world: in junior high-school curriculum, 235
Local control: of curriculum, 190; of education, 240
Logic: and views of teaching, 252
Low-ability students: effect of a large class on, 250

Marriages, teen-age: studies of, 209
Mass media: and automatic teaching, 213
Mathematics: improvement of instruction in, 205; new curriculums in, 227, 236
Medical curriculum, new: report on, 239
Mental health: and the school program, 210; curriculum materials for teaching, 211
"Methods courses": near-obliteration of, 238; timing of, 239
Minnesota Multiphasic Personality Inventory: relation to other variables, 249
Minnesota Teacher Attitude Inventory: relation to other variables, 249; use with student teachers, 239
Misbehavior: causes of, 248; relation to punishment used, 248
Mobility: effects on school turnover, 209
Monteith College: program of 238
Mothers' employment: effects on children, 210
Motivation: discussion of, 218; of student, and teaching methods, 250, by teacher comments on tests, 248; questioned as explanatory construct, 218
Multi-age plan: use of, 264
Multi-grade plan: experimentation with, 231; use of, 264
Music: facilities for, 263

National curriculum: discussion of, 229
Nongraded elementary-school plan: discussion of, 231; use of, 264
Nursing education: refinement of programs in, 239

Objectives, curriculum: discussion of, 230; of secondary education, 233; usefulness of, 191
Observation, classroom: focal points for, 253
Organization, school: and curriculum, 234; research in, 212
Overpermissiveness: effects of, in child rearing, 207

Parent-teacher-pupil conference: evaluation of, 232
Peer ratings: of social characteristics and teacher-pupil rapport, 249
Perception of student behavior, teacher's: accuracy of, and teacher's effectiveness, 248
Physical facilities: and the curriculum, 262; relation to educational program, 268
Physical sciences: new curriculums in, 228, 236
Physics: improvement of instruction in, 205
Physiology: as part of biological sciences curriculums, 236
Political and educational philosophy, Soviet: ideological sources of, 203
Prediction: of teaching success, 247
Pressure groups: effect on curriculum, 200
Principal: role of, in curriculum development, 258, 268
Problem-solving arithmetic: comparison of English and American students, 204
Project-centered teaching: vs. lecture method, 249
Psychiatry: application to problems of the scientific age, 206
Psychoanalytic theory: relation to teaching, 252
Public opinion: survey of, regarding school's tasks, 231
Pupil-teacher load: in Dutch schools vs. American, 204
Purposes of education: determination of, 188

Rapport: relation to personality indices, 249
Reading instruction, developmental: in junior high school, 235
Reading levels: grouping by, use of, 264
Role, superintendent's: perception by self and others, 191
Role, teacher's: discussion of, 253
Role-taking processes: of teacher, 248

School library: as a general materials center, 263
School organization: research in, 212

School sizes: and quality of education, 212
School structure and organization: and curriculum, 264
Science: place of, in curriculum, 205
Science programs, current: evaluation of, 236
Scientists: influence on curriculum, 205
Secondary education: curriculum decisions in, 233
Secondary-school teachers: training in liberal arts, 239
Self, concern for: by teachers, 249
Semantic differential: relation to teacher's verbal behavior, 249
Slum living: impact upon children, 232
Small schools: advantages and disadvantages of, 212
Social climate: effect of, 216
Social objectives of education: criticism of, by scientists, 205
Social perception: of children, 230
Social problem-solving behavior: investigation of, 192
Social psychology: application to teaching, 250
Social studies: controversial issues in, 202; curriculum in core classes, 235; new curriculums in, 228; planning of teaching facilities for, 263; units of study, effectiveness of, 251
Social system: school as, study of, 215
Social-science general education: curriculum in, 194
Socioeconomic class: and attitudes toward desegregation, 200; and child-rearing studies, 214; relation to other variables in school, 214
Sociology: application to problems of the scientific age, 206; effect of research in, on curriculum, 214
Sociometric pattern: of ability groups, 265
Sociometric status: relation to intelligence, 248
Soviet political and educational philosophy: ideological sources of, 203
Staff utilization: discussion of, 266
Student teaching: planned experiences prior to, 239
Student-centered teaching: vs. teacher-centered, 249
Study of Values: relation of teacher's verbal behavior to, 248
Styles of teaching: research on, 249
Subversive activities, investigation of: and voluntary censorship by teachers, 201
Superintendent: role expectations of major reference groups, 191; role perception by self and others, 191
Supervisor, curriculum: responsibilities of, 259
Supervisory roles: in curriculum development, 258

Teacher: functions of, 252; role of, and student-teacher relationship, 249, in in-service training program development, 261
Teacher aids: and curriculum, 234
Teacher comments: effect of, on tests, 248
Teacher education: guidelines for, 202
Teacher effectiveness: criteria of, 247
Teacher effectiveness ratings: relation to class size, 250
Teacher involvement in curriculum planning, 192
Teacher-centered teaching: vs. student-centered, 249
Teacher-pupil rapport: and grade averages, 249; of first-year teachers, prediction of, 249; relation to personality indices, 249
Teacher-pupil relationships: research on, 246, 247
Teachers colleges: comparison with liberal arts colleges, of liberal arts training, 239
Teachers' handbooks: preparation of, 262
Teacher's knowledge: of causes of pupil misbehavior, 248
Teaching: assessment of, 253; concepts of, 251; conceptual structure for, 247; definition of, 217, 253; effectiveness of, 247; logic of, 191; logical structure of, 253; principles of, from principles of learning, 252; psychotherapeutic view of, 252; research on, 246; successful, prediction of, 247; theoretical structure of, 248
Teaching machines: discussion of, 252; effect of, 214
Teaching methods: eclectic, superiority of, 217; nontraditional, discussion of, 238
Teaching teams: use of, 238
Team-intern teaching: school appropriately designed for, 263
Technological forces: effect on curriculum, 202
Televiewing, excessive: and behavioral concomitants of, 213
Television: credit courses, offerings in, 213; influence of, on social studies, 231; instruction, and class size, 267, effectiveness of, 213
Tests: effects of teacher comments on, 248
Tests of Basic Skills: use to compare Dutch and American children, 204
Theory of knowledge: and views of teaching, 252

Therapeutic communities: discussion of, 211
Therapy: relationship to teaching, 252
Transfer of training: relation to learning method used, 250
Trustees, college: and curriculum decisions, 194; and curriculum improvement, 240
Turnover, school: correlates of, 209

Ungraded school: examination of, from viewpoint of architect, 262; use of, 231, 264
Unit concept, social studies teaching: effectiveness of, 251

Values: effects of, on curriculum, 209; student, changing of, in schools, 215, relation to achievement and teacher's value pattern, 248; variations within social class, 214
Verbal behavior of teacher: influenced by his value patterns, 248

Women, changing role of: in work world, 210
Workshop: as preferred method of in-service education, 260

Youth, alienation from general culture: impact on education, 207

REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association. Contents are listed in the Education Index.

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Volume XXX, No. 4 **October 1960**

Higher Education

Reviews the literature for the six-year period since the issuance of Vol. XXIV, No. 4, October 1954.

Table of Contents

Chapter *Page*

I. The Entering College Student—Background and Characteristics 285
PAUL HEIST, *University of California, Berkeley, California*

II. College Admission-Selection Studies 298
JOSHUA A. FISHMAN, *University of Pennsylvania, Philadelphia, Pennsylvania*
ANN K. PASANELLA, *College Entrance Examination Board, New York, New York*

III. The College Environment 311
C. ROBERT PACE, *Syracuse University, Syracuse, New York*
ANNE MCFEE, *Stanford University, Stanford, California*

IV. The Outcomes of College 321
BENJAMIN S. BLOOM, *University of Chicago, Chicago, Illinois*
HAROLD WEBSTER, *University of California, Berkeley, California*

V. The Educational Program 334
RUSSELL M. COOPER, *University of South Florida, Tampa, Florida*
LEWIS B. MAYHEW, *University of South Florida, Tampa, Florida*
LELAND L. MEDSKER, *University of California, Berkeley, California*
JAMES H. BLESSING, *U. S. Office of Education, Washington, D. C.*
CHESTER L. NEUDLING, *U. S. Office of Education, Washington, D. C.*

VI. The Improvement of Instruction 351
W. J. MCKEACHIE, *University of Michigan, Ann Arbor, Michigan*

VII. Noninstructional Services 361
DANIEL D. FEDER, *University of Denver, Denver, Colorado*
DANIEL J. SILLERS, *University of Denver, Denver, Colorado*

Chapter *Page*

VIII. Evaluations of Institutions and Programs 371

DEWEY B. STUIT, *State University of Iowa, Iowa City, Iowa*

IX. Government, Administration, Co-ordination, and Financing of Higher Education 385

ALGO D. HENDERSON, *University of Michigan, Ann Arbor, Michigan*

M. M. CHAMBERS, *University of Michigan, Ann Arbor, Michigan*

Index 398

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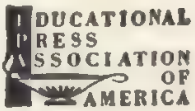

CHAPTER I

The Entering College Student—Background and Characteristics*

PAUL HEIST

No previous time in educational history has felt so much concern about the students who attend institutions of higher education, nor has there ever been so great a need simply to count the number entering different institutions and programs. Inadequacy of facilities, and often of faculty, is a continual concern, but increasingly large numbers of students at the college level since the second world war has intensified old and new problems of staff, educational program, and physical plant and equipment. In the last decade the questions, "Who should go to college?" and "Where should they go?" have for the first time become matters of widespread concern and debate.

Little research has brought a theoretical and experimental approach to the problems of selection, retention, and achievement. Institutions which are pressed for decisions regarding new policies and procedures on enrollment will as yet find little evidence to serve as a basis for making such decisions. The findings from surveys and studies to be reviewed here indicate that decisions concerning size of student body, character and quality of students to be admitted, and plans for expansion will be forced upon many administrators and staff before the data are available on which policies concerning admission and appropriate selection of students can be objectively determined. However, we seem to be in the early stages of a period in which the need for research is being recognized, and both educational agencies and individual institutions are beginning the necessary investigations (15, 16, 17, 45).

In this chapter the major emphasis is on *entering students*—in what numbers they are and will be coming, and what is known about the characteristics they possess.

Attendance Patterns in American Higher Education

The question of the number to be educated, since it bears directly on two of the major problems discussed by the President's Committee on Education Beyond High School (57), namely, the need for qualified teachers and the need for expanded facilities, is no longer a matter of the future; it is one of imminent significance.

* In keeping with Review policy, the literature reviewed was limited to that appearing 1956 and later. Only a few references, significant for historical reasons, antedate the last four years.

Current Enrollment Figures

There are several sources of enrollment data and trends at both the national and subnational levels. National data are regularly available from two sources: the Division of Statistics and Research Services of the U.S. Office of Education (34, 35, 56) and the annual survey by Walters (67, 68, 69). The Walters surveys have been conducted for 40 years, whereas those of the U.S. Office of Education have been available consecutively for only 14 years. The reports from the Office of Education present a more comprehensive survey of enrollment, inasmuch as they include all degree-credit students, in all institutions of higher education offering programs consisting wholly or principally of work applicable toward a baccalaureate or a graduate degree. In the 1958 survey, for example, only six out of 1903 institutions failed to furnish information (35). The publications from both agencies include generally excellent interpretations of the tabular data presented.

The first-time enrollment figures indicate that the number of entering freshmen has set a record for the last four years (the previous high was in 1949), although 1959 is the eighth year of successive first-time enrollment increases. The entering total in 1959 represented an increase of 5.9 percent over the preceding year, and the total enrollment rose 4.4 percent (35).

The data from these publications will be more meaningful if considered by type of institution (level and/or emphasis of the educational program). To illustrate, in the fall of 1959 approximately 4 to 6 percent more students than in the previous year entered junior colleges, teachers colleges, and universities, and 7.6 percent more entered liberal arts colleges; the enrollment in technological schools jumped 14.6 percent (35). In all cases, the increases were greater for women entrants than for men in each of the three years, 1957-59.

The number of students enrolled in 1959 in the United States and contiguous areas was equivalent to 36.2 percent of the population aged 18 through 21 (35). (This figure may be slightly misleading, since a great many college students are, of course, not "college-age.") The proportion has increased steadily since 1951, when 24 percent of the same age group were enrolled (35); in 1956 the percentage was 33.2. The estimated college enrollment in 1939 was equal to only 14.3 percent of the 18- through 21-year-olds; by 1970, the figure is expected to reach 44 percent (39).

Regional Differences

The national and annual state surveys (to the extent that the latter are available *) show considerable variation among geographical regions, not

* Data from state surveys, which vary considerably in scope, quality, and comparability of information, could not be summarized because of space limitations.

only in actual numbers enrolled in colleges, but also in the rates of enrollment change (35). Curiously enough, in the Far West and Southwest, which supposedly will have the greatest growth in the 18-24 age group between 1955 and 1973 (57), the growth in college attendance was not proceeding at a comparable rate.

For four-year institutions the increases among the major regions between 1957 and 1958 ranged from 5 to 14 percent. There was much more variation in the percentage increases in junior-college entrants; in the Far West there was almost no change, whereas the Rocky Mountain states experienced a 15.7 percent change, and six of the individual states in the Northeast had increases ranging from 21.9 to 69.8 percent (35).

Differences by Sex

There has been a growing concern about the education of women. Those interested in the topic should review the constructive reports of the Commission on the Education of Women of the American Council on Education (9, 10). All current studies relating particularly to women's education are reviewed in the *Information and Research Notes* published by the Commission (9).

In 1959, the women enrolled at all levels of higher education composed 36.1 percent of the total enrollment (34). From 1950 on, the percentage of the total enrollment accounted for by women has varied only slightly from 35 percent. Since 1957 an upward trend in the number of women has been in evidence; in 1959 this continued, with a 7 percent gain over the number entering the previous year, compared to a 3 percent gain for men (34). First-time enrollment, as well as total enrollment of women, has also increased more rapidly than enrollment of men since 1956.

It is of interest that the larger increases in numbers of women in the last few years, in comparison to those of men, occurred in all types or levels of institutions as they are categorized by the Office of Education. Even in technological and professional schools women held a slight edge, and in 1957-58 and 1958-59 the number of women in theological institutions grew proportionally much faster than the number of men (35).

Public Versus Private Institutions

The influx of larger numbers of students in the next decade will of necessity mean that proportionately more will be going to colleges under public control. This has been the trend of the last two decades, although the increases were small. The disparity will rapidly become greater because the support necessary for current operation and capital outlay must come in increasing proportion from public sources.

In the fall of 1959, almost 60 percent of all degree-credit students were in publicly controlled colleges and universities. This figure was only about

5 percent greater than the proportion in 1939. Though this difference (5 percent) characterized the shift in four-year colleges over the past two decades, the proportions changed considerably for junior colleges: 72 percent of their students were in public institutions in 1939, and 86.7 percent in 1959 (35, 69).

Graduate and Professional Schools

A fairly complete survey of the size and trends of graduate enrollments in various disciplines was published by the National Science Foundation in 1957 (51); this was based on a nationwide study of 1954. A briefer report on the distribution of graduate students in universities in the fields of the humanities, the social sciences, the biological sciences, and the physical sciences documented the shift over 60 years from the humanities to the sciences (1, 13).

As part of an excellent survey of college-going in Wisconsin, Little (43) investigated the plans of 90 percent of the seniors graduated from all degree-granting colleges in the state. He found that only one in seven expected to enter a graduate or a professional school; the greatest number of those seeking further education was in the natural sciences. Gropper and Fitzpatrick (23) in 1959, using a sample of 3581 students (undergraduate, graduate, and professional) from 35 institutions, explored the factors which influenced college graduates to continued their education. Two reports by the National Academy of Sciences (48, 49), preceding these others by several years, dealt essentially with the undergraduate college origins of doctorates in the various major fields.

Two comprehensive publications on the education of business students, by Gordon and Howell (22) and Pierson and others (53), are particularly illustrative of the lack of information about students in professional fields. Both studies reported that the average major in business administration was lower in scholastic aptitude than the average college student but gave few additional objective data on special aptitudes, interests, values, attitudes, or intellectual dispositions.

Studies of students entering several professions (those involving extensive education beyond an undergraduate degree) have grown in number during the latter half of the last decade. These vary considerably in scope, objectives, and the samples of students involved. The medical profession has received the major share of attention from several research groups; in two studies the emphasis was largely sociological (4, 47). Preliminary reports from the research staff of the Association of American Medical Colleges (18, 19, 20) on a longitudinal study of the characteristics and changes in attributes of medical students, from entrance to internship, have been released. Of particular interest was the evidence that medical specialities and certain groups of medical schools were differently selective or attractive as shown in students' measured personality characteristics.

The Council on Dental Education published the results of two surveys of entering dental students (2, 3). Heist (27) discussed the personality characteristics of a large sample of dental students and commented especially on the relatively few who showed potentiality for research and scholarship. Clark (7) took a diligent look at those who entered the profession of psychology; Holt and Luborsky (33) did the same for recruits to psychiatry, but with a considerably different approach from Clark's and from those of any of the other studies of professional students.

Students Abroad

The only comprehensive report on American students abroad and foreign students in the United States is *Open Doors* (37), released annually by the Institute of International Education. The information is obtained through surveys of specific institutions; in the last report on students abroad (for the year 1957-58), 78 percent of the 960 foreign institutions surveyed replied, and 57 percent of these reported a total of 10,213 students from the United States. This total of United States students represents a sudden increase of 34 percent over the number studying abroad in the previous year.

Selectivity of Higher Education in Ability and High-School Achievement

There is still a dearth of information on the relationship of ability to college attendance. The estimates quoted by Wolfle (76) in 1954 are still referred to as a base point for more recent figures. This report and one by Berdie in the same year (5) indicated that ability was the most important single characteristic associated with plans for college attendance or college-going. A study by the Educational Testing Service in 1956 (62) gave strong support to this conclusion by showing that ability was the major factor in college-going, even in a rather homogeneous, high-ability group. However, of the large national sample of high-school seniors studied, about one-fifth of those in the top 10 percent in ability were found to have no expectation of going to college. In a more recent report, Bridgman (6), after making an adjustment for the number entering the military service from high school, estimated that 95 percent of the male and 60 percent of the female high-school graduates in the highest tenth of ability entered college. For the top 30 percent in ability the percentages dropped to 90 and 58 percent for men and women, respectively.

A comprehensive state-wide inquiry in Wisconsin showed that high-school graduates attending college were mainly from the top third of their classes, both in aptitude test scores and in achievement (grades); the great majority of those in the lower two-thirds in ability were not planning to enter college (42, 43).

The selectivity in scholastic aptitude of American higher education as a whole, as well as selectivity by regions, by type of control, and by level of educational program, has been studied by the Center for the Study of Higher Education at the University of California, Berkeley (26, 44, 46). The data from a stratified random sample of all institutions of higher education documented the enormous diversity in the ability of entering students within and among institutions of all types.

Selectivity in Nonintellectual Characteristics

Comparatively little work has been done on the diversity within and among institutions in students' economic and social background, attitudes, and personality characteristics.

Socioeconomic Background

The cost of higher education, which is rapidly increasing, has been shown to be an important determinant of whether or not students attend college at all, and also of the particular schools they enter (8, 31, 32). Iffert (36) presented one of the more complete and informative reports on the relationship of economic background to such variables as receipt of scholarships and persistence, and showed that there is a relationship between the type of institution attended and the income level of the family. A recent study has shown that types of institutions in Minnesota are differentially selective in social background (44).

Several recent studies have emphasized the growing importance of scholarships and loans to undergraduates (39, 52, 74). Thistlethwaite (64, 65) analyzed the influence of scholarship awards as a determinant in the choice of college or university by high-ability students and believed scholarship to be a factor in the concentration of such students in a limited number of institutions.

The Educational Testing Service, investigating the college plans of more than 17,000 males, found that ability and father's occupation were significant factors in the student's decision (62). Sewell, Haller, and Straus (59), reporting one of the few extensive investigations involving a large sample of high-school seniors, found no relationship between the social status of the student's home and his level of educational or occupational aspiration when measured intelligence was controlled. Haller and Sewell (24) also found that rural-urban distinction in residence was not associated with educational or occupational aspirations in the case of Wisconsin high-school girls, and that, in the case of boys, occupational aspiration could not be predicted from residence, but that farm boys have less interest in a college education than do others. Smith and Penny (60) offered critical comments on some of the literature on educational opportunity as a function of socioeconomic status.

Both Wolfle (76) and Lipset and Bendix (41) concluded that, although social class may be related to college entrance, after admission the relationship between educational achievement and socioeconomic levels almost entirely disappears.

Values and Attitudes

A widespread concern about student values and attitudes is evident in the recent literature, the greatest part of which, however, is not based on research, although investigations in these aspects of behavior and development are rapidly growing in number.

The American Council on Education brought out a descriptive report (75) on entering students based mainly on a review of the literature and on interviews with research staff and administrators. To facilitate understanding of students and their education, the author argued for an increased perspective and a closer look at the supposedly changing attitudes of the current student bodies. A subsequent publication by Eddy (12), based on observations and interviews in 20 selected institutions, presented a "global," qualitative analysis of the attitudes of students and discussed implications for character education in the light of the thinking of students and the existing curriculums. There is little concrete information about the students in this second study, and the two reports differ on an interesting point. The former took special note of the differences in values and attitudes among students, whereas the latter stated that students in this country are not characterized by diversity, but by general similarity.

An interesting comparison between students and faculty in the way they view the important goals of education emerged from a study by Jarvis and Congdon (38). Freshmen could better predict faculty goals than could seniors. Faculty consistently placed intellectual goals highest; students, socioeconomic goals. Sussman (63) presented a critical review of the morale of freshmen in the performance-oriented atmosphere of Massachusetts Institute of Technology; she concluded that this environment is especially congenial to the attitudes and values of the upwardly mobile sons of middle-class and working-class families. The Little study (42) of high-school seniors in Wisconsin and a study by Douvan and Kaye (11) on a large sample of Girl Scouts presented information on goals and attitudes toward further education on the part of precollege youth.

The most recent, as well as the most comprehensive, work on the attitudes of students was produced by a team of sociologists (21). Their data reflected the thinking of students on a number of campuses regarding educational values, political and social attitudes, religious beliefs and practices, and sexual practices. The authors interpreted the students' professed attitudes, values, and behavior as products of the cultural milieu in which the institutions and students were located. They found the students positively oriented toward education and its values, uninterested in politics,

apathetic and conservative, and exhibiting religious beliefs (and a need for believing), but not strongly committed to these convictions. This investigation, which would have been improved by more thorough analysis, nonetheless may serve as a major reference point for future research on what college students think and believe.

A preliminary report on a four-year study at Michigan State University (40), which was concerned primarily with changes in student attitudes, included an extensive analysis of attitudinal responses in relation to a variety of background factors.

Personality Characteristics

The use of personality inventories and other psychological instruments to differentiate the characteristics of student bodies at various colleges and universities and subgroups within institutions has increased markedly (18, 28, 58, 61). In 1956 a major contribution by Stern, Stein, and Bloom (61) was directed to numerous facets of personality and attitude measurement. Of particular interest was the identification of three groups along an authoritarian-equalitarian continuum—stereopaths, rationals, and nonstereopaths. The authors showed that institutions differed considerably in the relative numbers of students found in these groups.

Several studies, longitudinal in approach and chiefly concerned with behavioral change, did present descriptive data on incoming students. Through the Mellon Foundation study at Vassar, data on college students from several campuses on a number of new personality scales were made available (58, 70). Plant (54, 55), in presenting the results of studies relating changes in ethnocentrism to college experience, also reported mean scores for entering students in a state college. The results from both the Vassar and the Plant studies, on quite distinct freshman groups, gave a picture of basic conservatism.

A number of studies dealt with samples of high-ability students. Research from the Berkeley Center for the Study of Higher Education (26, 29) delineated the differences on selected personality characteristics between a large sample of National Merit Scholarship winners and the students in certain California institutions. Comparisons were also drawn among students majoring in various curriculums (29). In another investigation using the same sample, students were selected and placed in two subsamples representing colleges ranked high or low on a criterion of scholarly productivity; significant differences were found on a number of measures of personality characteristics and values (26, 46). Other groups of institutions were also shown, in the case of National Merit Scholars, to be differentially selective or attractive with respect to intellectual disposition (44). Holland (30) reported personality measures on the *California Psychological Inventory* on other groups of National Merit Scholarship winners.

What might be most simply described as a psychiatric orientation toward students and their problems is found in two books (14, 71) discussing the roles and adjustments of entering students and upperclassmen. The more recent of the two publications, on Yale students, is considerably more objective and quantitative than the other, on Harvard students, based, as it was, on a variety of researches.

Enrollments of the Future

Because of the increases in birth rate since 1940 and the trend toward greater college attendance among the college-age group (33 percent of the 18-year-olds in 1955 compared to 12.5 percent in 1930), great concern has been expressed about the numbers that will be "knocking at college doors" in 1965, 1970, and 1975. Early enrollment estimates, varying a little in the bases employed for prediction, indicated that the college population would be between 5 and 6 million in 1970 (39) and that the increases for specific states would vary between 15 and 230 percent (66).

Recent projections of enrollments to 1970 are in general agreement with the earlier ones, although the projection of 6 million may be an underestimate. A recent figure of 6,400,000 represents about 3,000,000 more students than the total enrollment of 1959 (39). The larger figure is based on the expectation that a decade hence about 44 percent of the 18- through 21-year-olds will continue their education beyond high school. The expectation is based in part on the current acceleration in enrollment increases, which may not remain the same. A survey conducted by Roper in 1959 (39) revealed that almost 70 percent of parents expected their children to go to college. Havighurst (25), however, estimated that the proportion of the college-age group in college is not likely to increase materially.

An analysis by the Western Interstate Commission for Higher Education (72) indicated that the greatest problems are to be faced in the Western region, where both a greater birth rate and a much greater immigration will bring more than two, and perhaps three, times as many students. To those concerned with the probable size of future enrollments, a fact book by the Western Interstate Commission (73) and the *Fact Book on Higher Education* by the American Council on Education (1) should be of genuine value.

If the proportion of youth the President's Commission on Higher Education deemed worthy of some level and type of post-high-school education *does* attend in 1970, more than 6,800,000 (rather than 6,000,000) will be going to college from the 18 through 21 age group alone (50). Whatever the degree of accuracy of the projected figures, the essence of the various reports can be taken at face value. That is, by the end of another decade the present provisions and facilities will be engulfed by the tremendous numbers of college-going youth.

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CHAPTER II

College Admission-Selection Studies*

JOSHUA A. FISHMAN and ANN K. PASANELLA

Introduction

ADMISSION to college and selection of applicants has probably become the most intensively explored topic in educational-psychological research. Garrett (27) in his 1949 review covering nearly two decades mentioned approximately 194 studies; 580 studies made during the last 10 years were located.

The increased interest was a reflection of several developments. First, testing by standardized aptitude and achievement examinations sponsored by regional or national associations became an accepted part of the admission-selection process, though this fact was not entirely due to the greater number of applications or the practice of "selective admission." More testing has naturally resulted in more studies of the validity of the examining instruments and of the admission or guidance procedures; in addition, a number of such studies are attributable to colleges that have long practiced such procedures, but who have come to devote increasing attention to both technical perfection and philosophical justification in the light of the continued increase in number of applications. College admission-selection studies have therefore become more interrelated with theory and research in psychometrics, the social sciences, and educational psychology and philosophy.

The usual research design is that of correlation and regression, in which one or more *predictors* (measures taken previous to college admission) attempt to approximate one or more *criteria* (measures taken after the completion of one or more semesters of college attendance). The degree of predictive approximation to the criteria that is attained upon a relatively unselected group of applicants is taken as an indication of the efficiency of the particular set of predictors employed. It has become accepted to designate predictors and criteria as dealing with either *intellective* characteristics (aptitude-achievement test scores or course marks) or *nonintellective* characteristics (personality and motivational and attitudinal measures) of individuals. Since admission-selection studies may involve one or the other or both types of predictions as well as one or the other or both types of criteria, there are theoretically nine possible predictor-criterion combinations.

As the table on page 299 reveals, the first has thus far received most attention, and the combination of 1, 4, and 7 account for over 90 percent

* Inasmuch as no full treatment of this topic has previously appeared in the REVIEW, for general statistical and comparative purposes this paper covers the decade 1949-59. Reference to individual studies, however, is limited to the period 1955-59.

of the studies. The common denominator in these predictor-criterion combinations is intellective criteria (college grades) throughout. However, the greatest change occurred in connection with the greatly increased interest in nonintellective predictors and criteria (20).

TABLE 1.—PREDICTOR-CRITERION COMBINATIONS

Number	Predictors	Criteria	Studies(S) Number	Studies(S) Percent	Number of Colleges(C)	S/C
1.	Intellective only	Intellective only	408	70%	148	2.76
2.	Intellective only	Nonintellective only	2	[a]	2	1.00
3.	Intellective only	Both	2	[a]	2	1.00
4.	Nonintellective only	Intellective only	64	11	38	1.68
5.	Nonintellective only	Nonintellective only	17	3	10	1.70
6.	Nonintellective only	Both	9	2	9	1.00
7.	Both	Intellective only	70	12	44	1.59
8.	Both	Nonintellective only	5	1	5	1.00
9.	Both	Both	3	[a]	2	1.50
	Total		580	99%	[b]	[b]

[a] Less than 1 percent.
[b] Data are nonadditive.

Generally speaking, colleges which participate in such studies are—more frequently than would be expected from their proportional representation in the universe of American colleges—coeducational colleges, those receiving public tax support, those with the highest enrollments, those with the lowest tuitions, and those with the highest ratios of applicants to freshmen. In contrast, those colleges that have participated in selection and guided-admission studies less frequently than would be expected are women's colleges, Catholic and religiously affiliated colleges generally, those with the smallest enrollments, and those with the smallest ratios of applicants to freshmen. These ecological portraits apply about as well to the colleges at which *nonintellective* predictor studies are most frequently and least frequently conducted as they do to the colleges at which *intellective* predictor studies are most and least frequently conducted. This fact would also seem to imply that the number of studies of nonintellective factors will continue to rise sharply in the decade ahead, for such studies appeal to colleges with a tradition of empirical inquiry into the admission-selection process.

Prediction and Selection

Over 95 percent of the studies located were of the global type in method and goals. The term "global" here indicates use of general criteria of *over-*

all or comprehensive academic excellence or general desirability of one kind or another. The most frequently encountered examples of criteria were freshman-year grade average, first-semester grade average, and lower-classman grade average. In each case the criteria were based on all subject-matter areas, not focused on specific fields. Thus it may be said that most thinking was not only in terms of grades, but also in terms of the "over-all good" or "over-all poor" student.

Intellective Predictors: General Overview

The most obvious intellective predictor is the high-school record, usually expressed as total average grade or rank in class. For 263 studies in which it was employed, this measure correlated roughly .50 with comprehensive freshman-year intellective criteria. In 31 additional studies, it correlated .48 with comprehensive intellective criteria beyond the first year. But because secondary schools vary widely in standards, students, and curriculums, most colleges found it important to include some standardized aptitude and/or achievement tests in their selection measures. Among the most commonly used aptitude tests were (in decreasing order of incidence) the *Scholastic Aptitude Test* (*SAT*) of the College Entrance Examination Board, the *American Council on Education Psychological Examination for College Freshmen* (*ACE*), and the *Ohio State University Psychological Examination* (*OSPE*). Their correlations with comprehensive intellective criteria averaged .47. Several new aptitude tests which should see increased use were perfected.

Group intelligence tests such as the *Otis* were less commonly employed, because they have proved generally less satisfactory than tests geared more directly to the measurement of scholastic abilities. Achievement tests, such as the College Board series of one-hour examinations, the Cooperative Tests, the Iowa Tests of Educational Development, and various college-constructed tests were more often administered as placement devices than as selection instruments. (The distinction between aptitude and achievement tests became increasingly blurred as the test constructors became more skilled in developing achievement items which measure the ability to reason with facts.) Nevertheless, some achievement tests showed substantial correlations with global intellective criteria. Sixty-two studies of the relationship between scores on English or reading tests (Cooperative, Nelson-Denny) and freshman average produced results varying between .13 and .64, with a median correlation of .47. The College Board English Composition test showed a median correlation of .36 with the freshman average in 19 studies. Achievement tests (such as the Cooperative Tests in social studies or natural science, or the Iowa Tests) yielded results ranging from .03 to .74 in 84 predictions of freshman average, with a median correlation of about .45. Their median correlation with grades beyond the first year of college in 18 investigations was roughly .43.

Achievement tests were frequently applied to the prediction of grades in specific subject-matter courses. Grades seemed to be more difficult to predict than the global criterion, possibly because of the greater unreliability of a single grade.

There were many multiple-correlation studies. In 216 which employed only intellective predictors, the multiple correlations with freshman average ranged from .37 to .83, with a median of .62. Eleven similar combinations resulted in correlations between .50 and .72 (median of .65) with grades beyond the freshman year.

The usual intellective-predictor combination is an aptitude test plus the high-school record. The multiple correlations of these two predictors with the global college criterion ranged from .31 to .82, with a median of .64 in 24 analyses which did not utilize the College Board *SAT*. The College Board multiples extended from .34 to .82 (median of .61) for 147 studies predicting freshman average. In 21 studies which used an aptitude test and the high-school record, the multiple correlation was increased anywhere from .00 to .23, beyond the zero-order correlation based on high-school average alone, with a median rise of .07. In general, the use of any one intellective predictor, or more than one, with the high-school record improved the forecast of freshman average in 181 studies by .00 to .38, with an average gain of .11. It seems useless, however, to employ more than two or three intellective predictors, from both the point of view of practicality and that of efficiency.

Intellective Predictors: Noteworthy Studies

The use of intellective predictors in conjunction with intellective criteria has largely become an atheoretical and routinized procedure. Nevertheless, even the tried and true procedures are not universally known. As a result, the period 1955-60 saw two serious attempts at an elementary exposition of the logic and the procedures of admission-selection studies (7, 19). There was evidence that the most ordinary procedures (for example, use of scores on standard aptitude or achievement tests plus the high-school average) could result in quite extraordinary multiple correlations with grade-point averages. However, it is noteworthy that the highest multiples reported (in the high .60's and .70's) were all obtained in Southwestern and Western colleges in which selective procedures were either so new or so restricted by statute that they had no effect on the range of applicant talent (3, 8, 22, 37, 44).

The enormous drop in multiple correlation as a result of preselection restrictions in the range of talent was demonstrated by Holland (31), whose highest multiple correlations were in the low .20's for the high-ability National Merit Scholarship Group. On the other hand, Davis (12) showed that when restriction is not overly great, the standard instruments and methods are adequate for sizable groups of lower academic

ability. Ahmann (1) demonstrated that these preadmission data supplemented by the earliest postadmission grades (first quarter average) can give adequate predictions of graduation versus nongraduation.

In a few cases somewhat more novel questions were considered in the context of the intellective prediction of global intellective criteria. Thus Clark reported that Southern Negro students from disadvantageous home and school environments who attended integrated Northern colleges functioned at a higher level than was predictable from their *Scholastic Aptitude Test* scores and high-school averages (10). This study had particular significance because of its implications for the reversibility of earlier impoverishment, given appropriate individual motivation and institutional interest. A different but equally refreshing question was investigated by Spaulding (51), who found that adequate predictions of freshman college performance could be obtained from ninth- and tenth-grade test scores and academic averages.

Fricke's review (26) of 27 studies was incidental to his conclusion that (a) statistical prediction was more accurate than clinical prediction of academic success and (b) high predictive accuracy was undesirable because it implied an inability on the part of the college to challenge good students or to help poor ones. According to this view, prediction researchers should be continually at work to improve their techniques while guidance and faculty personnel should be as constantly involved in reducing the efficiency of these same techniques via special guidance, tutoring, and incentive programs.

Fishman (15) amassed evidence concerning the independent and joint validity of various College Board tests and also provided information on the relationship between scores on these tests and various characteristics of students, schools, and colleges. Spindt (52) provided a thorough review of run-of-the-mill prediction studies of the last quarter century and of the principles and cautions that have been derived from such studies. Bloom and Peters (5) emphasized methods for increasing correlation between high-school grades and college averages. Bloom's methods—which have long been practiced by a few advanced investigators—entail statistical corrections for intraschool and interschool nonequivalence of grades. These simple methods clarify the real predictive power of high-school grades and suggest that less independent variance is available for nonintellective predictors than has commonly been supposed. Bloom's work also reinforces the earlier arguments of those who have pointed to needed refinements in the college criterion as the next major target for further predictive improvement.

Nonintellective Predictors: General Overview

Search for nonintellective predictors was continuous. Surprisingly, some three score studies correlated nonintellective predictors alone with an

intellective criterion of success. It must be assumed that most such efforts were exploratory studies, inasmuch as no college selects students solely on the basis of motivational and attitudinal characteristics of applicants.

The correlations of personality measures such as *Rorschach*, *Minnesota Multiphasic Personality Inventory (MMPI)*, *Manifest Anxiety Scale*, and others with global intellective criteria ranged from .01 to .62, with a median correlation of .22 for 26 studies. Study-habits tests and inventories (*Brown-Holtzman Survey of Study Habits and Attitudes*, local tests) correlated between .26 and .66 with college freshman grades. The median correlation for 25 studies was .47. Interest inventories, such as the *Kuder Preference Record* or the *Strong Vocational Interest Blank*, yielded lower correlations, .05 to .26, though only seven such studies were reported. Correlations with college grades for biographical information (socioeconomic status, size of family, religion, size of community, campus activities, and living arrangements) ranged from .01 to .63, with a median of .13 for 23 studies. In nine studies based on ratings or interviews, zero-order correlations ranged from .26 to .77. (The very high figure of .77 represented counselor predictions of first-quarter grades.)

Few studies came to the point of combining intellective and nonintellective predictors by means of multiple-correlation techniques. Where this was done, the gain in multiple correlation attributable to the nonintellective predictor was discouragingly small. As a result, much of the literature on nonintellective predictors dealt with attempts to improve their technical and theoretical foundations.

Nonintellective Prediction: Noteworthy Studies

Two publications represented a theoretical revitalization of the nonintellective predictor area. The first was a preview of the Mellon Foundation studies at Vassar College conducted by Sanford and his colleagues (49). The second was a book-length report of several studies conducted by Stern, Stein, and Bloom at the University of Chicago (53). The former perceived the college years as a period of personality change and believed this change capable of differentiation into more and less desirable components with respect to the goals of a liberal-arts college. The latter sought to relate individual characteristics to institutional or classroom environments and processes so as to arrive at more tailor-made evaluations of individual performance. Taken together, these two approaches promised new instruments and new theoretical insights for the nonintellective prediction of college success. At this writing, however, the admission-selection promise inherent in these new approaches is still under investigation, although many researchers are now working to tease out operational implications along these very lines. The current literature dealing with nonintellective factors is still largely concerned with more fragmentary and less theoretically integrated studies.

In the intellective-predictor area, interest has been focused upon operationally functional instruments within the context of mechanically scored, mass preadmission procedures. In the nonintellective-predictor area, we are so far from having arrived at such instruments that investigators can still afford the luxury of "trying out" one or another technique or idea. The basic idea (or hope) underlying most work in the nonintellective-predictor area is that some of a group of applicants of similar superior academic talents will be better able to apply their talents to college work than others, as a result of motivational, attitudinal, or personality factors. Another way of stating this position is to hypothesize that college grades should be more predictable from strictly intellective predictors for those applicants with "facilitating" personality characteristics than for those with "interfering" personality characteristics. Hoyt and Norman (36) demonstrated the tenability of this hypothesis by a few simple *MMPI* contrasts, and Frederiksen and Melville (21) similarly used a novel combination of compulsiveness scores and *Strong Vocational Interest Blank* scores.

A large body of research is concerned with pinning down the above hypothesis for particular nonintellective instruments with widespread clinical followings. One obvious contender is the *Rorschach*. Osborne (47) was among the first to reveal that a slight gain in multiple correlation (namely +.04) could indeed be obtained by addition of a multiple-choice version of the *Rorschach* to a test of academic ability. McArthur and King (41) introduced the worthwhile conceptual refinement of searching for distinct "*Rorschach* types" at various campuses, the implication being that the successful personality type at one campus might not be successful at another. Cooper (11) demonstrated a similar point by showing that yet another variant of the *Rorschach* had greater predictive value for the academic work of males than of females. However, work with the *Rorschach* did not progress to the point of advancing conceptually refined variables or syndromes of general interest for selection or guided admission. Another clinical instrument about which the same seemed to be true was the *MMPI*, although Frick (24) and Frick and Keener (25) demonstrated that it too can result in modest cross-validated gains, namely, +.06 in the multiple correlation.

The scales recently developed by Gough (particularly the *Hr* scale), by Taylor, and by Edwards have prompted a modest degree of experimentation in approximations to the admission-selection setting. Gough's claim that his *Hr* scale measured the self-sufficiency and independent judgment components of college-level intellective functioning rather than intellect per se (29, 38) was tested by Klugh and Bendig (39) and subsequently by Bendig alone (4). In both instances, the *Hr* scale produced very minor gains beyond the values obtainable from classical intellective measures alone. Taylor's *Manifest Anxiety Scale* was found to yield an even less independent contribution in these same two studies. On the other hand, Bendig concluded that the Need Achievement scale of Ed-

wards' *Personal Preference Schedule* did show a bit more promise, since the increase in multiple correlation (over the zero-order correlation based on an intellective test alone) was +.09. It is important to point out, however, that in none of these studies (including those previously mentioned dealing with the *Rorschach* and the *MMPI*) was the easily available and always utilized high-school rank or average incorporated into the study designs.

Another popular area of inquiry was that concerned with study habits and related interests. Myers and Schultz (46) conducted an early study in this area and discovered that their measure produced a modest gain (+.06) when it was added to an intellective-test predictor. However, when both the intellective test and the high-school average were employed, scarcely any independent contribution was made by the experimental instrument. Unfortunately, a more recent investigation by Schutter and Maher (50) dealing with a forced-choice study-activity questionnaire did not similarly attempt to question their superficially large gains by incorporating both high-school average *and* intellective-test scores in the study design.

A topic commanding considerable activity was the biographical inventory. Myers' early study (45) established that a biographical inventory could indeed make an independent contribution with an intellective-test predictor, but it also demonstrated that this was hardly the case when the intellective test was joined by the high-school average. Malloy's *Life Experience Inventory* (43) also yielded substantial gains over the use of intellective-test predictors alone. Once more, it is unfortunate that the high-school average was not included in the design. If this had been done, it is likely that Malloy's findings would be the same as Myers'. The biographical inventory so ingeniously cross-validated by Anastasi, Meade, and Schneiders (2) has yet to be put to the test of being studied in an approximation to the admission-selection setting.

The repeated value of nonintellective predictors in conjunction with high-school rank or average holds more than technical or even practical significance. On the one hand, it points to the tacit nonintellective loading in high-school grades. On the other hand, it points to continuity in nonintellective factors contributing to good high-school grades and to good college grades—at least for the kinds of nonintellective factors thus far studied in admission-selection. Thus, there would seem to be a need for the clarification of nonintellective variables, either in the individual or in the environment, that undergo marked change in the transition from high school to college. This point of view is theoretically elaborated by Fishman (20) on the basis of earlier work reported by Pace and Stern (48), Heist and Webster (30), and, most directly, Lazarsfeld and Barton (40).

It seems likely that the coming decade will bring us closer to a realization of the true potential in the nonintellective-predictors area. However, it seems even more likely that whatever potential may exist will be recog-

nized by means of prior development of a solid theoretical foundation rather than by a shotgun "trying out" of instruments constructed for other purposes. When this day comes, it should also be possible to define the types of nonintellective factors that are not appropriately studied in a pre-admission (selection) context. Our goal must be not only to obtain as great a gain as possible from the addition of nonintellective predictors (9), but also to understand why we get the kinds of results we do, whether the gains be large or small.

Criterion Problems: Intellective and Nonintellective

The criterion problem is like the weather; everyone talks about it, but few try to do anything about it. No research and little theory construction were devoted to criteria of college success during the period under review. Academic grades and, to a less extent, achievement-test scores are strongly entrenched as the criteria of selection and guided admission in American higher education. This fact is greeted with joy by those whose educational philosophies are harmonious with it. It is greeted with dismay by the proponents of more subtle intellective criteria and nonintellective criteria.

Among the more subtle intellective criteria referred to above are those concerned with intellectuality in the personality. Many of the variables formulated by Sanford and his colleagues (49) at Vassar College and by McConnell and his colleagues (42) at the Center for the Study of Higher Education at Berkeley may be thought of as fusing or integrating the artificially separated intellective domains. It seems likely that the variables conceptually differentiated by these investigators can be validly measured and that their developmental course can be charted throughout the college years. However, whether or not they, or even some less revolutionary concepts such as postcollege interests and behaviors, can successfully challenge the criterion hegemony of course marks and achievement-test scores remains to be seen. Brown has shown that such newer criteria can be recognized by a college faculty but that many problems in the area of criterion reliability must still be tackled (6).

The prospect of newer and better criteria is exciting, as it offers fresh possibilities for relating the role of the college to the total development of the individual. However, in terms of selection and guided-admission procedures, the prospects raise a host of new problems—including that of whether or not it is defensible to select for college on other than intellective grounds. At the technical level, it is likely that nonintellective predictors will really come into their own when nonintellective criteria are available for them to aim at. On the other hand, this also implies the independent designation of predictor and criterion instruments or procedures in the nonintellective domain, and this designation has not yet been made. An attempt to deal with conflicting interests and difficult

technical problems in the criterion area was made by Fishman (18). Many additional attempts are needed.

Differential Prediction and Admission

The major difference between global and differential prediction is that, with the latter, the criterion is no longer an undifferentiated average but rather specific grades in specific courses or curriculums. This difference is not merely a technical one, since it is directly related to educational practices and institutional patterns. Those institutions which are more concerned with guided admission than with selection per se tend to be particularly attracted to the differential model. This model is also geared toward the educational philosophy which claims to be interested in the *particular* areas of excellence or insufficiency of each candidate rather than in his "*average*" excellence or insufficiency.

Horst (35), the major exponent of the differential-prediction model, reported on the general mathematical development which underlies his approach, as well as on its operational implementation (33, 34) and its educational and societal rationales (32). Recently, nonintellective test predictors have also been added to the battery of intellective and personal-background predictors which Horst originally employed. In addition to Horst, a few other investigators have utilized the differential-prediction approach. Unlike Horst, Stone (54) differentially predicted average grades in specific *curriculums* (commerce, education, physical sciences, and social sciences) rather than in different academic courses. Zeigler, Bernreuter, and Ford's goals (57) are identical with Horst's, although his mathematical operations are somewhat different. It is important to point out, in view of this similarity, that both Horst and Zeigler are operating in the context of a large and diversified state university program. Finally, somewhat different differential-prediction models have been developed by several investigators at Harvard (38, 55, 56) in conjunction with vocational-curricular guidance, and by French (23) in conjunction with test batteries assembled in accord with factor analytic considerations.

It is still too early to say whether the differential-prediction approach merits widespread adoption or even whether its adoption is feasible. On the one hand, the predictive efficiency obtained by these methods thus far is encouraging, but not startlingly so. On the other hand, this approach is operationally demanding in terms of the funds, numbers of applicants, and professional competence required for its implementation. It would seem to be particularly important to re-examine its claims in a period of considerable curriculum or applicant change, since either of these phenomena may undo the costly preparatory work upon which this technique rests at any given time. Dressel (13) has recently prepared a judicious, over-all review of the methods, assets, and disadvantages of the differential-prediction approach.

Conclusion

The increased interest of psychologists, social psychologists, and sociologists in higher education is a recent but welcome development. As a result, the philosophical and empirical problems related to selection and guided admission should, in due time, cease to be the undisputed preserve of psychometricians and directors of admission (14). Perhaps it is typically American that mass testing and the operational routinization of selection and admission have developed more fully than have consideration for the criteria or the educational-societal goals upon which selection and guided admission must rest. The new influx of intellectual forces in this area may reduce this imbalance by anchoring selection and guided admission in the philosophy of education at one end and in social-science theory and methods at the other. A few beginnings in this direction were made during the last decade (17, 42), and additional progress will undoubtedly take place.

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CHAPTER III

The College Environment

C. ROBERT PACE and ANNE McFEE

THIS ATTEMPT to deal with a new and vaguely defined topic is motivated by a variety of beliefs and events. First, the topic is important for future research. The concept of environment ranges in generality from the psychologist's idea of external stimuli or treatment to the anthropologist's idea of culture. One of the weaknesses of educational research has been the frequent effort to assess the impact of only a small segment of the learning environment—a particular class size or teaching method, for example. The results of such efforts are usually inconclusive or insignificant. A broader view of environment as a complex social system, a network of interactions, or, indeed, in the case of colleges, as a miniature culture, may lead to more productive research.

Second, in recent years a new group of behavioral scientists—sociologists, social psychologists, clinicians, and psychiatrists—has become active in studying higher education, supplementing and enriching with new concepts the past and continuing activities of educational testers and evaluators. Many reports reviewed here come from research groups or special projects which had interdisciplinary character and dealt with the college environment broadly: the Center for the Study of Higher Education at the University of California, the Bureau of Applied Social Research at Columbia University, the Mellon Foundation at Vassar College, special projects sponsored by the Hazen Foundation and by the American Council on Education, Cornell, Syracuse, and Yale Universities, the National Merit Scholarship Corporation, and the Association of American Medical Colleges.

Third, many specific studies primarily focusing on characteristics or changes in college students can be viewed as contributing some understanding of the college environment.

Fourth, descriptive studies, conceptual schemes, and research dealing with the characteristics and operations of organizations appeared with some frequency and offered suggestions for studies of college organizations and environments.

This chapter does not include static accounts of student or faculty or organizational characteristics. It encompasses research or concepts bearing on environment (in the anthropological sense), on studies of interaction between person and environment, and on studies which suggest environmental or institutional dimensions of demonstrated or potential value for research on the impact of college environments on college students.

Institutional Atmosphere

The Jacob Study (38) found little evidence that courses, curriculums, teaching methods, or faculty had much influence on changing students'

values. Jacob ascribed the peculiar potency of some colleges to a distinctive institutional atmosphere. There were colleges where students' scores on tests were typically high in some direction and where there were typically large changes in students in that direction from freshman to senior year. In a review of Jacob's report, Riesman (53) suggested that the absence of specific impact of colleges on many students was perhaps a tribute to their general effectiveness, in that "middle-brow" culture had been decidedly influenced by academic values. He also noted that the distinctive ethos of certain colleges might be simply a reflection of the already existing view of students who chose to attend them. Barton (2), carefully examining Jacob's report methodologically, observed a need to regard the college as a system of interacting elements, to study differences between types of colleges, and to specify effects on different types of students.

Dressel and Mayhew (16), reporting the American Council on Education's Cooperative Study of Evaluation in General Education, observed that in some schools students made high gains on the *Inventory of Beliefs* and on the tests of critical thinking in the natural and social sciences, whereas in other schools students' gains were small. In general, the high-gain schools had certain institutional characteristics which were absent in the low-gain schools.

The Cornell Values Study, reported by Goldsen and others (28), was not primarily comparative, but it ascribed many influences on students' activities and attitudes to the particular college cultures or to definite subcultures within college environment. Shifts in students' judgments during college about the importance of various educational goals were generally toward a higher valuation of academic goals and a lower valuation of vocational goals and interpersonal skills. The fraternity system was cited as a particularly influential reference group in many colleges, especially in respect to participation in campus activities, dating, drinking, cheating, and having a good time.

The importance of the over-all climate of the college was stressed by Eddy (19), who examined data from interviews and participant-observer notes at 20 colleges. He observed that in small, homogeneous colleges standards were influenced strongly by the total community, but that in more diversified colleges students sought out smaller reference groups. The character of the college was attributed to such elements as the level of expectancy of performance, the physical arrangement of the buildings, the effectiveness of communication among various campus groups, and the style of personal relationships between students and faculty or among the students. He concluded that a college had the greatest impact on its students when its components reinforced the major college goals.

Sanford (57) reported high lights of the Vassar College studies. Freedman (22) noted that the student body as an entity possessed characteristic qualities of personality which, like a culture, provided the basic context in which individual learning occurred. Brown (7) found that major types of college careers could be related to five patterns of college experience:

(a) social- and peer-group orientation, (b) overachievement, (c) underachievement with family orientation, (d) high achievement, and (e) search for identity.

In a series of studies on the sociology of medical education (46) edited by Merton, Reader, and Kendall, Thielens (62), comparing entrants to medical and law schools, found that differences in environments resulted in differences in students' perceptions. Other studies of medical education were edited by Gee and Glaser (24). Funkenstein (23) noted that the predominance of students with certain characteristics within a school determined to a great extent the atmosphere and opportunities in the school. Schools could be classified, he believed, as ideistic or pragmatic. In ideistic schools, students were concerned with self-understanding, abstract ideas, the arts, and literature; saw medicine as a cultural tradition; and were typically planning careers in research or teaching. In pragmatic schools, students emphasized concrete goals and economic and social prestige values and planned to become practitioners.

Reports from the Center for the Study of Higher Education by McConnell and Heist (43) and by Heist (32, 33) observed that the atmosphere of a college is fixed by the character of the student body. They documented the diversity of student characteristics by noting that institutional mean scores on the *ACE* in a stratified representative sample of colleges ranged from 35 to 143. Moreover, National Merit Scholarship students go with three to 15 times the expected frequency to schools which rate high on the *Knapp-Greenbaum* index of scholarly productivity. Thus, given the quality of students at certain colleges, it follows that these colleges will have a high productivity index. Samples of students equated for *Scholastic Aptitude Test* scores in 50 high-productive schools compared with those from 50 low-productive schools differed in respect to several of the scales on the *Omnibus Personality Inventory*. Equating for scholastic aptitude was not adequate assurance of the similarity of student bodies.

Drawing on previous studies by Stern, Stein, and Bloom (61), Pace and Stern (49) constructed a *College Characteristics Index* consisting of 30 10-item scales to measure environmental press, each scale designed as a counterpart of a personality need. In an analysis of 32 schools where both the *College Characteristics Index* and the *Stern Activities Index* had been given, Stern (60) found that the differences among institutional environments were substantially greater than the differences among student bodies. He also noted some tendency for students to be found at institutions where the environmental press was compatible with their personality needs.

Pace (48) reported a factor analysis of environmental-press variables in 32 colleges and a factor analysis of institutional similarity. Two bipolar factors accounted for most of the variance among the environmental-press variables: one was theoretical-intellectual versus practical, status-oriented; the other was group-welfare-oriented versus rebellious. The first factor, however, was separated into two parts, one emphasizing humanistic,

reflective, and sentient pressures and the other emphasizing pressures toward science, competition, and autonomy. The variables which grouped together across the sample of 32 colleges were also found to group together within individual colleges.

Using the *College Characteristics Index* and also a modified version of it, Thistlethwaite (63) found that certain scales were highly correlated with institutional productivity in natural sciences and other scales were highly correlated with institutional productivity in social sciences, arts, and humanities. The institutional productivity indexes were equated for initial talent-supply differences, so that the resulting correlations were presumably more clearly dependent upon environmental characteristics than upon student characteristics.

Wedge (64) described salient aspects of the Yale University undergraduate environment. In the same report of various Yale studies, Davie (15) noted that satisfaction, as a function of the interaction between student and environment, could be viewed in two ways: (a) with focus on the student's effort to satisfy needs as he manipulated the environment, satisfaction being interpreted as a measure of drive reduction, or (b) with focus on the environment as posing requirements to which the student must adjust, satisfaction being interpreted as a measure of fit. Rust (56), in another Yale study, found that three achievement groups (under, over, and normal) reported similar study habits in high school but quite different study habits in college. He hypothesized that achievement in college reflected a change in the environment which acted differentially on differences in personality and values existing prior to college entrance.

Faculty Subculture

Studying reactions of social-science faculty members in 165 colleges to matters of academic freedom, Lazarsfeld and Thielens (41) analyzed their data in various ways to reveal relationships among institutional characteristics. They found, for example, that conservative teachers were more oriented toward the institution which employed them, whereas permissive teachers (meaning critical-minded and tolerant of new ideas) were more oriented toward the profession at large. Permissive teachers were more likely to be productive scholars; the better the college, the more of its teachers were permissive. Also, the better the college, the better its administration protected the faculty.

Caplow and McGee (9) noted a similar dimension in faculty characteristics—orientation to the discipline versus orientation to the local institution. This dimension corresponded to research versus teaching, mobility versus immobility, and high prestige versus low.

In an analysis of manifest and latent social roles, Gouldner (29, 30) described faculty members as cosmopolitans and locals, terms derived

from Merton (45). Cosmopolitans were low on loyalty to the organization, high on commitment to their special skills, and tended to have an outer-reference-group orientation.

Eckert and Stecklein (17) and Eckert, Stecklein, and Sagen (18) observed that personal interests and motivation were influential in attracting people to college teaching –interest in the subject matter, the intellectual challenge of the job, or the desire to work with college students. Nevertheless, half the sample of faculty members studied felt that they had come into the profession more or less by accident. These authors, as well as Farber and Bousfield (21), found a majority of college teachers coming from low socioeconomic backgrounds.

Hemphill (34) developed a *Group Dimensions Questionnaire* for specifying the characteristics by which differences among groups may be described. Descriptions of 19 college departments by 130 faculty members in one university showed that these groups were high in the characteristics of stratification, potency, participation, and hedonic tone. They were low in homogeneity, permeability, control, and viscidity.

Images

Holland (36, 37) studied students' explanations of college choice and parental expectations about college. In answer to a question about what aspects of a college made it "best," parents of National Merit Scholars listed quality of faculty, scholastic standards, curriculum, reputation, and facilities. In the actual choice of college, practical and financial factors were of substantial influence, academic factors playing a moderate, secondary role.

From Coleman's study (11) of high-school climates, Cutright (12) concluded that the school atmosphere exerted some impact on the motivation of students to attend college, but, except for girls, this was not realized in actual college attendance. Brown (6), Fager (20), and Schuhle (58) dealt with faculty or student conceptions of ideal students or academic ideals, generally discovering only moderate differences of opinion. Kerins (40) argued that conflict between students and administrators was inevitable and desirable.

Student Subculture

Siegel and Siegel (59) found that the greatest changes in students' attitudes in respect to authoritarianism and status occurred when they took an imposed, initially nonpreferred membership group (an assigned college dormitory) as their reference group. Rogers (54) documented reference-group influences on student drinking behavior. Brown and Bystryn (8) studied the impact on authoritarian attitudes of minority

groups at three colleges—a small Eastern liberal arts college, a large Eastern university, and a Catholic women's college—and found that the challenge to existing authoritarianism was greatest at the small nondenominational liberal arts college. Glicksberg (26) analyzed students' essays on cheating, noting that an impersonal atmosphere, plus a college emphasis on competition for success, fostered cheating.

Davie and Hare (14) concluded that the peer culture was the most important single external factor in the students' experience at "Ivy." The small and relatively homogeneous student body led to group solidarity, which was reinforced by geographical isolation, the absence of motor cars, and dormitory life. Birney and Taylor (4) hypothesized that orientation to college increased with experience as the individual discovered the sources of reinforcement which coincided with his ability and talent.

Heath (31) described four types of students at Princeton and suggested that different educational experiences and approaches were probably needed to reach them effectively. McArthur (42) found many personality variables and reactions to college life related to public versus private school attendance, or, more generally, to the school-family-class subculture. Miller (47) reported changes in religious values of students from freshman to senior year at one college, finding that all students changed but that the average scores were nearly identical. Wise (65) summarized data on the characteristics of college students and pointed out ways in which the college climate today differs from that of previous generations.

Organization, Structure, and Theory

Goffman (27) described the characteristics of total institutions, such as homes for the aged, mental hospitals, and jails. Among the totalistic features were the breakdown of distinctions among play, work, and sleep places; sets of coparticipants, and different authorities; and such features as mortification processes, privilege systems, standard social processes, varieties of adaptation alignments, and institutional ceremonies. Dornbusch (15) noted the process of isolation, identification with new role, and change in self-conception in the assimilating characteristics of a military academy. Becker and Geer (3) saw the formation of student cultures in a medical school as helping students accommodate to the facts of life of the school and as providing conditions for considerable deviation from formal roles. Page (50) commented on the growth of bureaucracy in higher education. Henry (35), analyzing types of institutional structure in psychiatric hospitals, concluded that if certain properties, such as autonomy and detachment, were desired in a system, a specific type of structure had to be devised to produce them.

Attempts to analyze organizations—as in industry, management, or bureaucracy generally resulted in descriptive or propositional, rather

than dynamic, models: March and Simon (44), Presthus (52), Parsons (51). Argyris (1), however, emphasized the incongruity between the needs of mature personalities and the requirements of formal organizations. Getzels and Guba (25) ascribed two classes of phenomena to a social system: (a) institutions with certain roles and expectations that will fulfill social goals and (b) individuals with certain need dispositions inhabiting the system. They made a useful distinction among the concepts of effectiveness, efficiency, and satisfaction: (a) effectiveness is the congruence of behavior with role expectations, (b) efficiency is the congruence of need dispositions with behavior, and (c) satisfaction involves congruence of need dispositions and role expectations.

The concepts of role expectations and reference groups were prominent in the Merton studies of medical education (46) previously cited. The transition from student to physician was seen as the adoption of a perceived role. Application of role theory to the study of liberal-arts-college environments would appear to depend on the clarity with which the roles presented by the college can be defined.

Brim (5) considered the major problems of institutional analysis under five headings: (a) aims, (b) allocation of materials, (c) allocation of personnel, (d) roles, and (e) functions. Clark (10), in a case study of a junior college, emphasized the importance of the administrative setting of a college in relation to clientele and community as a broad determinant of its character. Kelley (39) proposed that a college was a culture matrix which included three interactive elements: (a) the culture the student brings to the campus, (b) the traditional and established culture of the college community, divided into administrative mores and student mores, and (c) the material structure and physical equipment of the college campus.

From the studies of college environments reviewed here, it is clear that a variety of concepts have been useful—such as role, reference group, interaction system, press, and congruence. Recurrent dimensions have included the following: (a) cosmopolitan-local, permissive-conservative; (b) theoretical-practical, status, ideistic-practical; (c) humanistic, practical, social press, and Rosenberg's (55) major dimensions of students' occupational interests as people-oriented, extrinsic-reward-oriented, and self-expression-oriented. Other recurrent dimensions may emerge from further research. No general theory has yet found wide acceptance.

Some studies have shown the importance of student characteristics in setting the tone of a college; other studies have shown the influence of environmental characteristics in changing students' behavior. What happens to similar students in contrasting environments and to contrasting students in the same environment needs further exploration.

College environments which have some conflict between parts and some over-all harmony, but not too much of either, may be most educative. A theory which includes concepts of limits, balance, and movement may be needed.

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CHAPTER IV

The Outcomes of College

BENJAMIN S. BLOOM and HAROLD WEBSTER

THIS CHAPTER will consider the factors underlying the mortality and survival of college students, the changes both cognitive and affective in these students, and the permanence of these changes.

Why many students do not finish their college work has been investigated many times over. That it is a problem is evident from the amount of effort expended in studying it, but why it is a problem is not so clear. Perhaps we assume that an individual's education is not complete unless he has followed to the end a specified program of study. Viewing mortality and survival from the institution's viewpoint, the problem is one of determining the number and characteristics of students who do not get through to the end. From the individual's viewpoint, it seems to be whether he completes that part of the educational program which makes sense to him. Most research on mortality and survival is done from the institutional viewpoint.

The most comprehensive investigation was made by Iffert (22) for the U.S. Office of Education. Iffert's study should serve for some time as the basic reference for empirical and theoretical investigations of student mortality and survival in higher education. From data on students who began at 149 institutions in 1950, it attempted to answer three major questions: (a) What is the rate of student dropout in relation to type of institution, economic status of family, motivation of student, academic performance, amount of self-help, participation in extracurricular activities, and residence of the student? (b) What reasons do students give for transferring to other institutions and for discontinuing college attendance? (c) What implications do the characteristics of students and their mobility have for higher educational institutions with reference to recruitment, selection, admission, counseling, instruction, scholarship, and other functions?

Iffert found that about 40 percent of freshman entrants graduated from the institution originally chosen during four years (1950-54). Fifty-one percent graduated from the same or some other institution in that period. He estimated that approximately 60 percent graduated or will graduate from some institution. Forty-two percent of the entrants, however, completed no more than two years, and 27 percent completed no more than one year. The proportion of graduates to initial enrollees was higher for the privately controlled institutions than for the publicly controlled, and higher for technological schools than for teachers colleges.

Iffert reported on the relation between persistence and reasons given for going to college. He also reported the relation between persistence levels and student reactions to college facilities and services. Students who changed interests in college proved more likely to graduate than did stu-

dents who maintained the same interest. Students who maintained interest in a subject field distinctly occupational in character had higher persistence and graduation rates than those whose interests lay in nonoccupational fields. The most frequent reasons given for transfer to another college were general dissatisfaction and change in curricular interest. "Low grades" was sixth on the list of reasons given for transfer.

Fullmer (16), studying records at the University of Denver of students who changed their major fields, found that 48 percent graduated, as compared with 32 percent of those who did not change their major fields. Students who changed were as successful academically as those who did not change, and their grades after the change were not significantly different from their grades before. These findings agreed with Iffert's. Fullmer concluded that changing educational objectives does not indicate weakness on the part of the student.

In a study of dropouts at the end of the freshman year, Yoshino (50), at the University of Arizona, found significantly lower high-school grade point averages and *ACE* Psychological examination scores for dropouts than for those who continued as sophomores. The most frequent reasons given for dropout were: lack of preparation in high school, inadequate finances, no clear-cut field of interest, poor study habits, lack of interest in required courses, and marriage. He concluded that 42 percent of dropouts could not meet academic requirements, and the remainder dropped out for economic, social, or personal reasons. There was, however, no single simple and absolute reason; rather, many factors were related in many ways.

Bragg (3) found that 58 percent of students dropped out of "W. U." during the first two years. High-school averages and first-semester grades of the dropouts were significantly lower than those of the continuing students, and a significantly larger number were at the twentieth percentile or lower on the *ACE* Psychological *L* score and on Cooperative English test score.

Holmes (21), studying 75 students who withdrew voluntarily during or at the end of the freshman year in the College of Liberal Arts at Syracuse University, found two-thirds dissatisfied with food and one-quarter dissatisfied with housing arrangements. Only 30 percent were satisfied with academic counseling, and 50 percent had negative feelings about the counseling system. Twenty percent were dissatisfied with classroom instruction and personal contact with faculty. Eighty-four percent of Holmes' respondents transferred to another college, usually nearer home.

Grace (18), approaching personality factors and college attrition differently, gave *Minnesota Multiphasic Personality Inventory (MMPI)* scales to two groups of students (107 withdrawals and 107 continuing students) matched as to scholastic aptitude. The *MMPI* scales were scored for responsibility-irresponsibility and for dependence-independence. The highest proportion of withdrawals was classified as irresponsible-dependent. Next in proportion were irresponsible-independent and responsible-dependent. The lowest proportion of withdrawals was among the students classified as

responsible-independent. These trends held for both males and females. Grace concluded that independence, responsibility, and manifest anxiety are clearly relevant to college attrition. This study should lead to more penetrating studies of mortality and survival.

Some suggestions may be drawn from Slater's attempt (42) to develop a theoretical context for research on persistence and attrition among college men. Slater identified four types of student perceptions about college: (a) as a means to a specific job, (b) as a resource for personal intellectual development, (c) as a means to a degree, and (d) as contributing to no clear academic purpose or goal. He differentiated among college curriculums: (a) courses to develop highly skilled practitioners and (b) courses to develop well-informed and intellectually resourceful individuals. Developing hypotheses and predictions about the consequences of combining students having various perceptions with different colleges and curriculums, Slater provided a provocative framework for research on a problem which has too long been limited to survey methods and the more obvious approaches to differences in scholastic aptitude and achievement. The framework has yet to be put to empirical test.

Changes in Information and Intellectual Abilities

Almost every statement of educational objectives for higher education includes reference to changes in information and problem solving. Attitude, value, and personality changes are less frequently named. The evidence on such changes is summarized in the third part of this section. There is no clear evidence that the college environment and the college curriculum make a real impact on values and personality. It is encouraging, nevertheless, to note the amount and quality of research which seeks evidence in this very complex aspect of individual development.

The contrasting assumption that higher education increases the individual's fund of information and the quality of his intellectual abilities and skills rests on evidence collected over the years by tests and observations. That students possess more information and greater facility in attacking cognitive problems at the end of a course or curriculum than they had at the beginning has been so well demonstrated that this fact perhaps explains the recent paucity of research in this direction. Jacob (23), studying changing values in college, summarized the major research which demonstrates that statistically significant gains are found in some colleges on tests of critical thinking which are given as pre-tests and then as retests after one or more years of general education. Beyond this, one must turn to studies of methods of instruction—such as TV or large-class, discussion or lecture—for research which bears on this topic.

Buckler (5) reported significant gains in theme writing and in English fundamentals for both television and control sections of a two-semester English course at New York University. The themes were graded by the Educational Testing Service. Macomber and Siegel (29) used themes writ-

ten at the beginning and the end of a semester of composition and literature instruction. The themes were graded by readers on mechanics, organization, content, and effectiveness of sentence and diction. While the majority of comparisons between pre- and post-tests found gains for the large-class instruction significant, few were significant for the control or regular-instruction groups. Clearly significant gains were not always in evidence the first semester, but were still fewer over the second semester of instruction. Macomber and Siegel were primarily interested in comparing large-class and small-class instruction—which did not show significant differences. The evidence that one or two semesters makes a significant difference in quality of writing is far from clear in this study.

Dreher and Beatty (10) found significant improvements in student scores on subject-matter tests in introductory psychology, economics, and basic communications in the control or normal course presentation, but no significant differences between the television and control sections.

Changes in Personality

It is now generally realized that cognitive and intellectual aspects of personality are functionally related to affective or motivational states. Although the relationships may be indirect or obscure, aptitudes and abilities are related to attitudes and values. Numerous studies found authoritarian attitudes to be correlated negatively with intelligence. Kagan and others (24) found differences in motivation between children who gained and those who lost in IQ over four years. Other examples could be cited. The discussion of the development of college students is here limited to personality changes which are primarily noncognitive or nonintellective in nature. Similar summaries by Lehmann (26) and by Norman and Tomlinson (36) appeared previously in the REVIEW.

Cooper (8) and Mayhew (32) each commented on the dearth of precise educational research; the number of studies which were primarily empirical, or which employed actual measurements, was strikingly small. It was not surprising, therefore, to find precise *longitudinal* studies of college students even fewer. Moreover, interpretations of observed longitudinal changes usually ignored the effects of changes in general social conditions and the more immediate effects of various college cultures or subcultures on the development of students. This narrowness of interpretation (in some cases partly justified by actual research limitations) necessarily limits our understanding of student development. Accordingly, this section is not restricted to reports of test-retest changes; it discusses some research which has employed other—less precise, but usually more general—approaches.

The Educational Process

There was increasing awareness of the complexity of the educational process from the time the student enters college until well after graduation;

for example. McConnell and Heist (30) described the diversity among entering students in numerous institutions on college aptitude test scores and on measurable personality characteristics. The variations, both within and among institutions, suggest that it is unreasonable to expect the same personality changes to occur within all college cultures or among all students at one school.

As Stern (43) observed, after the student has entered college, his development becomes an ecological problem in which initial personal characteristics interact with the college environment. Stern, Stein, and Bloom (44) were perhaps first to note that stereopaths (authoritarians) tend to withdraw, in greater numbers than nonstereopaths, from a liberal-arts program which emphasizes intellectual values. Importance of the authoritarian syndrome continued to increase in educational research. Using the *E* scale, a measure of ethnocentrism, Plant (38) compared students who withdrew voluntarily from San José State College with those who remained in school. Groups were initially matched on intelligence and ethnocentrism. Over a two-year period, students who remained in college became significantly less ethnocentric, whereas those who withdrew did not. Plant (37) later retested 86 percent of a senior class, who had also been tested with the *E* scale as freshmen, and found that a significant decrease in ethnocentrism had occurred. Freedman (15) and Webster (47) reported the same change in longitudinal samples of Vassar College students. Apparently education decreases ethnocentrism—in those students who choose to remain in college.

Further Studies of Authoritarianism

A number of studies reported by Dressel (11) and his colleagues, on 11 years of research aimed at evaluation of the basic liberal-arts program at Michigan State University, have a direct bearing on personality change or development in undergraduates. For example, Mayhew and Warrington (34) found that students who successfully accelerated, by substituting examinations for courses, were usually nonauthoritarians, as revealed by an *Inventory of Beliefs*. Degree of participation in extracurricular activities was unrelated to acceleration, although nonaccelerating students more often joined fraternities and sororities. Mayhew (33) concluded, from a number of studies, that even though personality traits measured by the *Inventory of Beliefs* were relatively stable and probably deeply embedded, they were nevertheless modified during college—"whether it be by education, maturation, or just getting away from home we do not know" (p. 230).

Dressel and Mayhew (12) discussed some implications for improving the education of rigid or authoritarian students; in general, the latter were less autonomous than nonauthoritarian students, and therefore needed more supervision in course work. Gladstein (17) found that gifted, successful students attending the University of Chicago and Syracuse University differed in study habits and activities, depending upon whether they were stereopaths or nonstereopaths. An analysis by Lehmann and Ikenberry

(27) of pre- and post-test results for a large sample of students still enrolled in the spring term (after a period of eight months) at Michigan State University revealed significant changes, for both sexes, in the directions of less stereotypy in attitudes, more emergent values, and increased critical thinking.

Del Popolo (9) found the classroom behavior of student teachers attending a New York college related to scores on an authoritarianism scale, the *A* scale, which was derived from a similar scale used at Vassar College; in addition, classroom behavior and *A* scores were significantly correlated, as predicted, with scores on the *Minnesota Teacher Attitude Inventory* (*MTAI*). All 360 students of a pilot study group, an experimental group, and a control group, pre-tested at the beginning of the sophomore year, were tested again at the end of the junior year. High critical ratios were reported for all comparisons of high-scorers with low-scorers on the classroom-behavior checklist; these ratios were higher for the *A* scale than for the *MTAI*, and this was also the case for the longitudinal comparisons within both experimental and control groups.

Attitudes and Knowledge

A few studies found the attitudes of students unrelated to knowledge or achievement. Mayhew (33) noted that, in the absence of knowledge of a defensible means of influencing students' attitudes, instructors typically assume that attitude changes result merely from changes in knowledge and understanding. In one experiment (p. 220), students who had completed the general-education course, Effective Living, were found by pre- and post-testing to have shifted in attitude in a desirable direction; that is, they moved toward belief in the value of majority decisions, increased in criticalness of authority, subscribed to active participation (on a social issue), gained in respect for the general welfare of others, and gained in catholicity of interests, open-mindedness, and responsibility. Dahnke (11, p. 226) found attitude changes during the Effective Living course unrelated to growth of knowledge in the course; Mayhew saw this finding as bringing into question the way in which attitudes are to be affected if they are in fact unrelated to knowledge.

The Jacob Report

Jacob's survey of research on student attitudes and values (23) has undoubtedly been the most widely discussed and criticized work of its nature in recent years.

Jacob concluded that the principal effect of undergraduate education was one of socialization rather than liberalization. Curriculums and instructors may influence student interests to some degree, but basic values

remain largely unaffected. Students actually become more homogeneous and less individualistic during college. They are tolerant, but they are also contented, self-centered, materialistic, and politically irresponsible, except for a few distinctive liberal-arts institutions, colleges have a negligible effect upon these characteristics.

Although educators were little inclined to question Jacob's general conclusions, his work was criticized on a number of more specific points. For example, Riesman (39) contended that Jacob had not sufficiently differentiated among kinds of data, that he had ignored important differences between college and noncollege populations, and that his view of students was overly censorious. According to Riesman, students who did not aspire to wealth or power, for example, but wanted family-centered lives, should not be described as materialistic.

Webster (45) found Vassar College students becoming more, rather than less, heterogeneous on most of the attitude measures obtained during college—an effect opposite to that which would have occurred if withdrawals from college had increased homogeneity. There remained the possibility, of course, that certain noncollege groups might have become even more diverse in attitude during the same age period, and there was therefore no conclusive evidence on how college experience affected the heterogeneity of young persons' attitudes. Barton (1), after discussing a number of related problems, urged more systematic research "on the enormously diverse set of experiments which is American college education today . . ." in order to answer some of the challenging questions raised by Jacob.

From interviews with faculty and students of 20 colleges, Eddy (13) corroborated some of Jacob's conclusions, finding variations in "the depth and the scope of the task which both the college and its students agree to pursue and in the intensity of the pursuit." A major conclusion was that a college's best contribution to character development would emphasize commitment to principles, but would depend primarily on "a properly balanced emphasis on learning." Eddy found much awareness of problems, and a willingness to discuss them, but some vacillation and confusion among students and a failure on the part of the college to develop "critical, active, and inquisitive minds." He recommended that research deal with faculty, compare students with nonstudents, seek the sources of precollege character growth, and observe the co-ordination of high-school and college programs.

Intensive Studies of Personality Functioning

Heath (19, 20) described a longitudinal study of 36 Princeton students of the class of 1954. Over 200 interviews, plus numerous group discussions, were recorded during the college careers of these subjects, who fell into three types along an impulse-control dimension: the stable and

noncommitted (N=19), the achievement oriented "hustlers" (N=9), and the moody, spontaneous "plungers" (N=6). They were also classified according to degree of involvement with work and with people, the non-committed group gaining most on this dimension during college. The three types on the impulse continuum seemed to function best with different educational treatment. Heath's findings are of interest, even though the intensity of the study undoubtedly provided subjects with a kind of psychotherapy which influenced their development. It may be important that independent research at Vassar College led to the construction of similar developmental dimensions for describing women students. Freedman (14) observed Vassar students' desires to be accepted by the student culture, or peer group. The peer culture emphasized social acceptance and the leveling of individual differences; it discouraged serious relationships with faculty, which might have had the effect of changing students' values. Bushnell (6) reported that lack of commitment to intellectual goals or objectives, common to most Vassar students, was related to a desire to maintain their feminine identity, and to an "orientation toward home and hearth"; despite seniors' high educability, they did not transgress the bounds set by student culture and by society at large. Sanford (40) distinguished education, psychological health, maturity, and other developmental objectives, but emphasized the importance of the student culture in obtaining them. The culture contended that "the college work is to be taken seriously, but not too seriously . . . . If an ethical decision has to be made, the proper course is to see what the others think."

Lazure (25) compared changes in Vassar students with those observed in women attending French-Canadian Catholic colleges. Differences in the kinds of change seemed to be directly related to differences in the role expectations for educated women in the two cultures. The Canadian woman's role was more clearly defined, and therefore less personality disturbance ensued. Brown (4) asked the Vassar College faculty to nominate seniors believed best to personify the effects of liberal education; a substantial number of nominees had not obtained high grades. These impressive students with lower grades had distinctive personality-test profiles.

Some measures of theoretical importance in understanding change in college students were developed at Vassar, by means of a large pool of personality-test items (48). One scale measured freedom from authoritarian traits, such as compulsiveness, rigidity, punitiveness, submissiveness to power, a primitive conceptualization of others, cynicism, and anti-intellectualism; a second scale (41), which was nearly independent of the first, measured a readiness to express impulses or to seek gratification of them in overt action or in conscious feeling and attitude. Most students gained on both these traits during their college years.

Items distinguishing seniors from freshmen formed a third scale (45, 46), which corroborated the kinds of attitude change previously observed. Freshmen scoring high on this scale (that is, freshmen whose general

attitudes were like those of seniors) differed in a number of respects from those scoring low, as determined from interviews. High scorers had been both more independent socially than low scorers before entering college and more critical and undogmatic ideologically. Similar results were obtained for a sample of older alumnae.

Freedman (15) further described some characteristics of high and low scorers on these and other measures used in the Vassar College research. Vassar seniors scored slightly higher than freshmen on most of the scales of the *Minnesota Multiphasic Personality Inventory*. This result was consistent with the general findings about differences between Vassar seniors and freshmen (whether the same or different students): seniors were less conventional than freshmen, more critical of authority, more tolerant of weaknesses in others, more aware of their own sexual and aggressive impulses, and more likely to experience inner conflicts. The tests developed at Vassar were administered at various women's colleges, and the changes observed between the freshman and the senior years resembled the changes observed at Vassar. Such changes seem to indicate systematic personality development in late adolescence—including characteristic ways in which problems or conflicts are recognized and resolved.

Matteson (31) reported that analyses of increases and of discrepancies in interests and experiences over a two-year period supported the hypothesis that students' interests are modified by a program of general education. Levels and patterns of interest changed as new experiences became available, and the selection of educational objectives (for example, choosing a major) became a "developmental process," observable in counseling. In a longitudinal study of De Pauw University students, Wright and Scarborough (49) related shifts in interest patterns during college to increasing independence. Most students came from backgrounds where the climate was favorable to science and other "practical" subjects, rather than to the arts; in the freshman year, interests reflected this fact, but later shifted away from it, for example, toward interest in persuasive and artistic activities.

The Persistence of Changes

Questions were raised about the permanence or stability of changes in students. It has been assumed that college "prepares" for later life; if this is indeed the case, then changes which occur during college must be understood in terms of consequences long after graduation. Bender (2) and Nelson (35) reported persistence of most religious beliefs or values to be observable during the second decade after graduation, but adduced little evidence about how this persistence was related to development during college years. A few studies prior to the period covered by the review have shown that changes in expressed beliefs during college may persist or increase long after graduation, but actually nothing is known about

conditions which would favor or discourage persistence of attitudes or values. It seems likely, however, that general social conditions, as well as more specific situational influences, would be involved.

Technical Problems

Progress was made toward understanding the technical problems which arise in studies of change or growth. Lord (28) demonstrated why exact comparisons of *difference* scores, using ordinal (test-score) data, are impossible. Some meaningful comparisons are feasible, however, with certain reasonable assumptions. Measurement has been refined, but to distinguish change which is of central importance from various kinds of ancillary changes (which might better be described as "error") remains a problem.

Caldwell (7), for example, reported changes on scores of the *California Test of Personality*, obtained only six weeks after college entrance. Tests of significance indicated that a "true" change had occurred, and it was necessary to interpret the differences. A number of subtests revealed systematic gains corresponding to increases in different kinds of adjustment. These gains had the appearance of simple "practice" effects, but actually Caldwell's interview data disclosed that those students who gained the most were well aware of diverse influences associated with their changed scores. These influences included the stress of orientation week (during which the pre-test was administered), changes in testing conditions, the effect of the new (college) environment between tests, changes in test-taking attitude, and the like. Some of these influences could be described as contributing either to "true change" or to "measurement error," depending upon the investigator's notion of what he wished to measure.

Finally, it has been well established that difference scores based upon unreliable component scores are highly unreliable; consequently, investigators should always report internal consistency coefficients for both pre-test and post-test if they wish to infer that nonrandom, or true, change has occurred. The problem of measuring change or growth therefore depends directly upon the theory of test reliability, a topic which has received renewed attention, but which requires further elucidation.

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CHAPTER V

The Educational Program

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IN THE ANALYSIS of the widely varied programs in higher education, it has seemed best to organize the literature according to the type of institution or program presented. The first three sections deal with these major types, and the fourth discusses interrelationships and articulation.

General and Liberal Education

Though most books, articles, and reports on general or liberal education are descriptive or polemic, an increasing number of items present some elements of empirical study. This sort has become significant since the major philanthropic foundations began to subsidize massive studies of education. It has also gained as institutions, either with or without subvention, reviewed their undergraduate programs and reported their findings. A national concern with a few issues implicit in liberal or general education, such as the problem of values, has added substantially to the literature.

Jacob (56) summarized hundreds of studies and reached the conclusion that colleges and universities did not have much effect on student values. His methodology was examined by Barton (11), who pointed out the difficulty in presenting a synthesis of studies done with varying rigor. Smith (91) also commented on Jacob's findings and urged that educators take to heart the sobering judgment of college students. Stimulated in part by the public uproar over the Jacob book, Eddy (37) made a participant-observer study of students in selected colleges at the request of the American Council on Education and found that, when well-supported, imaginative designs were used, there was evidence that the college experience had a substantial impact on student values. Carpenter (19) offered no substantial evidence of colleges' success in modifying values, but did reveal some significant experiments. (See also Chapter IV.)

By its nature, general education invites study and analysis by those in various kinds of professional education. The American Society for Engineering Education (4) discovered a trend of increasing technical content in engineering curriculums and urged that this trend be reversed by inclusion of social-humanistic studies in undergraduate programs and more theoretical work in the professional engineering courses. Stewart (95)

* Responsibility for proposing material for the chapter was delegated as follows: General and Liberal Education, Lewis B. Mayhew; Technical and Semiprofessional Education, Leland L. Medsker; Graduate and Professional Education, James H. Blessing; Articulation of Educational Programs, Chester L. Neudling.

found that students with nonscience premedical training achieved in medical school as well as, or better than, students with heavy undergraduate science concentrations. A need to provide more generally educated teachers who are at the same time technically more proficient has led to various studies and projects. Illustrative is a study conducted by Temple University (99), which subsidized students of seven different colleges in an enriched but extended teacher-training program. While the subsidy lasted, general education flourished; when it ran out, so did much of the enthusiasm of both colleges and students.

The publications emerging from Earl J. McGrath's Institute for Higher Education are so significant as to warrant special attention. In the first series of reports, McGrath and Russell (67) found a growing tendency for professional education to become more liberal and for liberal education to become more professional. Dressel, Mayhew, and McGrath (34) found that professional faculty members tend to agree with the abstract goals of liberal education but that they attach real significance only to those subjects having practical values. Drawing on the background of such studies, McGrath (66) judged that education can no longer afford a sharp dichotomy between liberal and professional studies. Russell (88) found that nursing education is now moving to eradicate the dichotomy. That no type of professional and technical education must exclude liberal and general studies from the curriculum because of the age and character of students is in part established by DeCrow (24), who showed that evening students do as well in liberal arts courses as regular students, if not better.

Several studies dealt with the integration of general or liberal education. Hong (55) perceived an integrating principle in a core of required general-education courses linked with a theological orientation. This solution found favor in a number of the colleges and universities described in the National Society for the Study of Education (NSSE) Yearbook, *The Integration of Educational Experiences* (75). Many institutions attempted to integrate educational experience by creating senior synthesizing courses. Stickler (96) surveyed the country, and his descriptions of such courses revealed a variety of methods, the most typical of which is a senior course based largely on one of the four major disciplines. Relatively few institutions have succeeded with a single integrated course to be taken by all seniors regardless of the field in which they are majoring.

A number of national and regional studies were concerned with all or part of general or liberal education. Dressel and Mayhew (30), presenting the outcomes of the Cooperative Study of Evaluation in General Education, showed that students achieve general-education objectives, but do so differently from one institution to another. They also showed that, starting with an evaluation problem, changes in teaching procedure can result (28, 29, 31, 32). Methods for the improvement of teaching were likewise among the greatest gains found in studies by Trowbridge (100) and Hill and Potthoff (54). The Hill-Potthoff book and that edited by Sebaly (90) are concerned chiefly with the general-education aspects of teacher preparation.

Sebaly concluded that even in the face of the doctrine of separation, state-supported colleges can add important religious elements to their general or liberal studies.

Even more numerous than regional or national studies have been various inquiries of institutions into their own programs. Eckert and Keller (36) reported on studies of University of Minnesota students and graduates. So did Dressel and his colleagues at Michigan State University (25). Syracuse University, which has concentrated on training teachers for general education, reported a 13-year evaluation and found the program essentially sound. One chapter in Hamilton and Blackman (49) summarized research studies dealing with the general-education program at Michigan State University.

Brubacher and Rudy (17) and Schmidt (89) wrote solid histories which emphasize the distinctly American character of the liberal-arts college and the peculiar curriculum problems it faces.

Useful bibliographies on general and liberal education appeared. McGrath and his colleagues developed major lists. Dressel and Mayhew (33) offered a selected list of works appearing up to 1954, and Dressel (26, 27) prepared two annotated bibliographies of research. Hatch and Bennet (52) announced bibliographies based on reported studies of general and liberal education, and other aspects of higher education as well.

Technical and Semiprofessional Education

The literature of technical and semiprofessional education tends toward generalization and observation rather than empirical data. The limited number of studies available dealt primarily with (a) the need for such training, (b) the types of institutions offering it, and (c) analysis of specific programs. There is some confusion over terms, but technical education is here defined as training for occupations between those of the skilled worker and the professional scientist or engineer. Semiprofessional education is used as a broad term to denote post-high-school training of a non-baccalaureate nature for a variety of occupations, including medical and health services, business, and those related to science and engineering.

The Need for Training

The need for trained people is generally expressed in terms of the ratio of technicians and semiprofessional workers to engineers, scientists, and other professionals. Henninger (53), sampling employers of technicians nationally, found that in industry the median ratio of technicians to engineers in 1957-58 was .8 to 1. Approximately 30 percent more technicians were needed than were available. He predicted that within the next decade employers would require more than twice as many new technicians as new graduate engineers.

The American Society for Engineering Education (6) announced that the United States is training only one-third as many technicians as are

needed, and recommended a 5 to 1 ratio of technicians to engineers. A study prepared for the U.S. Congress (85) stated: "The shortage of subprofessional technicians may well represent a greater threat to the nation's security than does the shortage of engineers or scientists." Similar findings have been reported in various states. A study in Connecticut (21) revealed a ratio of 1 to 1 and recommended a ratio of at least 3 to 1. A Florida study (40) revealed need for a minimum ratio of 2 to 1. A survey of 237 business organizations in Oregon (80) predicted that increase in the number of technicians employed in the future would be much greater than in the number of workers generally.

Although technicians and semiprofessional workers constitute a large and increasing proportion of the nation's labor force, data are difficult to obtain. This is because (a) definitions of "technical" and "semiprofessional" are not precise, (b) many people with full professional training are employed in subprofessional categories, and (c) there is wide variation in the use of such workers among professions and industries. The nation's rapidly changing occupational structure resulting from expanding technology and automation suggests the need for a thorough and continuing analysis of technician jobs and the training required for them.

Preparation of Technical and Semiprofessional Workers

Primarily three types of institutions prepare technical and semiprofessional workers: junior colleges, community colleges, and universities.

The California State Department of Education (18), Dye (35), Gordon and Howell (46), Harris (50), Koch (59), Medsker (68), Montag (70), the NSSE (76), the President's Committee on Scientists and Engineers (84), the U.S. Department of Labor (101), and Van Wagenen (103) all stressed the growing importance and responsibility of junior colleges to provide this type of education. Montag (70) showed that graduates of two-year experimental nursing-education programs of junior and community colleges performed their duties well, supporting the belief that these colleges can, with proper planning, become centers for nursing education.

Medsker's (68) analysis of enrollments in 75 two-year colleges in 15 states revealed that only about one-third of the entering students enrolled in technical or semiprofessional curriculums, although two-thirds of those entering did not transfer and hence became terminal students who presumably would have profited from occupational training. He identified several problems which the junior college faces as it attempts to prepare semiprofessional workers, among them the lack of precise information about needs of such students and the greater prestige attaching to a program which leads to transfer and a baccalaureate degree.

Smith and Lipsett (93) and Henninger (53) delineated the important role of technical institutes in training technicians. Smith observed that in 1954-55 these institutions offered 347 different technical curriculums, 251

being technological in nature and only 96 pertaining to nonengineering occupations. Henninger's comprehensive analysis caused him to conclude that "the technical institute idea in higher education has achieved in several significant areas of industrial and civic life a recognized pattern." He perceived one of its major problems to be lack of educational and professional status, both for itself and its graduates.

Four-year colleges may, and often do, offer technical and semiprofessional training not requiring the bachelor's degree. The U.S. Department of Health, Education, and Welfare found that almost one-third of such institutions offered technical programs and almost three-fourths of the two-year institutions had organized occupational curriculums.

Curriculums and Enrollments in Various Technical and Semiprofessional Fields

Armsby, Eells, and Martorana (7) analyzed enrollments in the organized nonbaccalaureate occupational curriculums offered by two- and four-year institutions in the United States for both 1956 and 1957. In 1957 a total of 204,795 students enrolled in engineering courses, and almost twice that number in nonengineering programs. Of students enrolled in nonengineering, related programs, the largest number was in business and commerce. Nonengineering, related curriculums included courses in such occupational areas as agriculture and forestry, the applied and graphic arts, education, home economics, and health services. In one study Medsker (68) ascertained that in junior colleges more students were enrolled in terminal business curriculums than in any other technical program, though in another sample he found that the number of students in engineering curriculums slightly exceeded those in terminal programs.

Problems in Technical and Semiprofessional Training

In addition to the fact that technical and semiprofessional training does not always command the status and prestige necessary to attract students, other problems are inherent in it. There is, for example, the question of curriculum content and the amount of general education which should be included. Booher (16), surveying 48 institutions and 249 technical curriculums, found that the average time devoted to general education was 9.6 percent, exclusive of New York, where it was 20.32 percent. Henninger's study (53), however, showed the median of general-education courses in curriculums currently accredited by the Engineers' Council for Professional Development to be only 3 percent.

There is need for a thorough study of requirements in subprofessional occupations which, when combined with the personal needs of individuals, will help point the way to a desirable balance between occupational and general education. How much specific training can be acquired on the job,

permitting more curricular time to be devoted to general education and the related basic sciences? No significant research on this question was found. If community colleges and technical institutes are to become increasingly responsible for the preparation of technical personnel, the nature of the training program for such personnel must soon be determined.

Other problems identified with technical and semiprofessional education include (a) shortage of teachers and (b) lack of training facilities. Montag (70) concluded that "the need for personnel prepared to teach nursing in the junior-community colleges is great and the development of these nursing programs is definitely related to the preparation of personnel equipped to carry on such programs." Henninger (53) submitted evidence to show that the number of full-time day instructors for all technical institutes should be increased 36 percent by 1960, and 79 percent by 1965, over those available in 1956. Beatty (12) concluded that technical-institute facilities would have to be increased sixfold to tenfold within the next decade at a minimum cost of $3 billion. Quattlebaum (85) pointed out the shortage of facilities in both technical institutes and junior colleges.

Graduate and Professional Education

Research continued to concern itself with the nature and purposes of the graduate program, but another area of interest—the impact of federal and other research and fellowship programs and the capability of the graduate schools to respond to suddenly crucial national needs—emerged as a second major subject of research. In professional education, several important studies of particular fields appeared.

Graduate Education: Purposes and Programs

The relevance of graduate education to college teaching continued to receive much attention. Some operative programs designed as preparation for college teaching were described by Albright and Barrows (1). Strothmann's report for the Committee of Fifteen (97) recommended broader curriculums, teaching internships, and redefinition of dissertation requirements as a means of meeting the needs of future college teachers. Though there seems to be general agreement that an introduction to teaching is a desirable component of graduate education for those who plan to teach, surveys of interested opinion show opposition to any fundamental modification of the traditional orientation toward scholarship and research. Axelrod's summary of the American Council on Education conference on college-teacher preparation (10) provided an excellent analysis of the problem. At bottom, educational values are at issue: Should German *Wissenschaft* or a less rigorous, more liberal kind of learning, supposedly more appropriate to the needs of undergraduate colleges, prevail? Berelson (13) pointed out that research, not liberal-arts-college teaching, has be-

come the major occupation of doctoral graduates. Thus, the instrumental argument for change has lost some force. Berelson has completed, but not yet published, a survey of major significance based on an elaborate analysis of statistics and a wide-ranging poll of opinions. His conclusion is that the Ph.D. degree "is what institutions of higher education want—so much so that that fact gets in the way of any radical experiment, and many moderate experiments, to prepare college teachers differently." (13, p. 92.)

A troublesome consequence of this basic reliance on doctoral preparation is the inability of the graduate schools to produce the number of Ph.D.'s the colleges need. The Committee on Policies of the Association of Graduate Schools (9) investigated factors tending to prolong the process of completing the Ph.D. and then advocated (8) a well-defined, three-year doctoral program and a rehabilitation of the M.A. degree. The Southern Regional Education Board is currently studying the problems of length of time and uncertainty connected with work toward the doctorate in 15 major fields.

Other curricular and organizational problems were brought to light in institutional self-studies done at Columbia (86), Harvard (38), Florida State (41), and Pennsylvania (57) Universities, and elsewhere. There appeared to be much room for improvement, even granting consensus upon objectives and methods. These studies have a wide usefulness as mirrors for practices and models for studies elsewhere. Hatch's bibliography (51) of institutional research in graduate and professional education reported by institutional representatives to the U.S. Office of Education remained an important service.

Perhaps the most important single study of graduate education was Ness's compilation (77) of existing doctoral programs and requirements, listed by institution and, in a supplemental index, by field. Ness's introductory essay also provided an excellent informal guide to graduate work for prospective or beginning students.

Graduate Education as a National Resource

Realization of the importance of graduate education as a source of scientific and professional manpower resulted in a vast new research effort, conducted for the most part by national agencies, aimed at finding out what is being done, and what can be done. The federal government has been especially interested in measuring its involvement in, and the impact of that involvement upon, the graduate enterprise. The National Science Foundation study (74) of university expenditures (from all sources) and resources for scientific research in 1953-54 provided valuable, but now outdated, measurements of the extent and cost of research activities. The Office of Education is beginning a study, authorized by the National Defense Education Act of 1958, of the educational programs of all federal departments and agencies as they utilize institutions of higher education.

and of the effects of these programs upon the colleges and universities. Kidd (58) dealt with every aspect of the impact of federal aid on research. One of his findings was that large-scale federal support of research has served generally to improve, rather than impair, the quality of graduate education in the sciences and engineering. The National Science Foundation (72) and the American Council on Education (2) urged governmental agencies and universities to adhere to policies designed to preserve the financial independence and educational efficacy of university programs.

The need for national statistics concerning graduate education has become acute. Graduate enrollment and degree statistics continued to appear in the biennial (83) and annual (44) publications of the Office of Education. The gross enrollment statistics have not been very helpful, but the office has undertaken a new survey of graduate enrollments for the fall of 1959 at first-year, intermediate, and terminal-doctoral levels in 60 fields in the sciences, health professions, and selected social sciences.

The National Science Foundation (73), by means of a questionnaire survey of department chairmen, gathered and analyzed data on first-year and advanced enrollments and on fellowship, teaching-assistantship, and research-assistantship support of four-fifths of the nation's graduate students during the year 1953-54. This survey provided the precise and detailed picture of the national supply and financial encouragement of graduate students which must underlie any determination of what is required to meet the nation's needs for graduate-trained manpower. The Office of Education has completed, but not yet published, the results of a survey of graduate fellowships awarded for 1959-60 in each of the fields of arts and sciences, and also (much needed) of graduate schools' capacities for enrolling additional doctoral candidates in each of these fields.

Professional Education

Because of the diversity and structural decentralization of professional education, most research has been confined to single fields. Only works of far-reaching importance or comprehensive scope have been included in the bibliography. These works pertain to the fields of business (46, 82), engineering (5), journalism (107), law (78), library science (61), medicine (3), public administration (98), social work (22), and theology (79).

Two general surveys of professional education, both edited by Blauch (14, 15), were published by the U.S. Office of Education. The former described the development and academic requirements of each field of professional education, and the latter the agencies, standards, and procedures of accreditation in those fields. McGlothlin (64), comparing the educational programs of 10 professions, tested the practices of each profession against those of others. McGrath (66) and Dressel, Mayhew, and McGrath (34), studying the relationships between undergraduate professional education and liberal-arts education, observed that professional schools

have in recent years greatly increased the amount of general education required, that liberal-arts colleges have greatly increased their professional offerings, and that the two types of institutions are becoming more and more alike in their purposes and curriculums.

Articulation of Educational Programs

Research on articulation has tended to broaden the definition of the term to include not only transition from level to level or from school to college, but also the problems attending acceleration, greater flexibility in the curriculum, and transfer from one college subject field or program of instruction to another. Recent interest in advanced placement, early admission to college, honors programs, and independent study has contributed to this extension of meaning. Growth of junior colleges, which now have both terminal and college-preparatory programs, has increased the range of the articulation interest. There has also been an upward extension in the meaning of the term "articulation" to include graduate and professional schools.

The most recent formal definition of articulation indicates the present scope of the term: "the relationship and interdependence existing among the different elements of the educational program; may designate the degree of relationship among the different curricular offerings, between the curriculum and the institutional regimen, student activities, and provisions for pupil guidance, or between the school's program and out-of-school educational institutions and activities . . . or the degree to which the interlocking and interrelation of the successive levels of the educational system facilitate continuous and efficient educational progress of pupils." (45, p. 39.)

Intra- and Inter-Institutional Co-ordination of Programs

The Western College Association (104) in 1959 explored institutional co-ordination, but concluded that secondary schools were not adequately represented in efforts to achieve such co-ordination. A lateral extension of the articulation problem as it affects institutional planning was explored by several studies. Litchfield (62, 63) raised the question of articulation among units of the complex university. McGrath (65) showed how such problems of organization in the complex university affect a program of general education.

Junior-College Transfers

The most heavily researched area was articulation concerned with transfer students, especially those transferring from community and junior

colleges to four-year institutions: for example, Florida State University, in one of a series of studies (42) relating to junior college and other transfer students, found significant articulation problems within a single state system. In California, Gray (48) found nonacademic factors to affect achievement of junior-college students transferring to San Diego State College.

Other Articulation Areas

Transfer of students between four-year colleges, between colleges and universities, and between undergraduate and graduate or professional schools was also much studied. Milholland (69) observed performance of transfer students in the University of Michigan. Wilson (108) pointed to the articulation problem of students transferring from undergraduate colleges to professional or graduate schools. Wolf (109) reported on a project for integration of the last year of college and the first year of medical school.

Research in Subject Areas

Studies in the sciences and mathematics predominated. Lawrence (60) reported on methods of improving articulation in chemistry. Columbia University (20) reported that college-level science courses and research projects in its science honors program contributed to both college motivation and achievement of high-school students. Fliedner (39) explored relationships of science courses in high schools and colleges, and Smith (92) reported on specific problems of articulation in science. Van Engen (102) explored continuity in the mathematics curriculum, and Rosskopf (87) outlined methods of articulation of the secondary-school and college mathematics programs.

Advanced Placement

Of programs designed to improve articulation, advanced placement appears currently the most active and is represented by the greatest concentration of research. The College Entrance Examination Board took over the Advanced Placement Program in 1955 and has presided over its remarkable growth since then. Studies of administrative action, growth, and statistical summaries of the programs were carried out by Perry (81), by Stetson University (94), by Wilcox (106) at Harvard University, and by Yale University (110, 111). Large-scale experiments with advanced placement were reported by the Westminster Schools (105) and by the National Council of Independent Schools (NCIS) (71). In general, research on advanced placement indicated continuing experimentation in

course content and emphasis. The NCIS study (71) reflected this condition and underlined the fact that nearly half of the secondary schools presenting one or more candidates for advanced placement subject-matter examinations in 1958 were private secondary schools and members of NCIS.

Early Admission

The study of early admission published by the Fund for the Advancement of Education (43) in 1957 set forth results of the program to that date. Faculties of participating institutions, reviewing students' records, concluded that early admission had been wise in at least three out of four cases. The 1350 Early Admission Scholars admitted in 1951-54 generally showed better academic performance than their classmates in college. They also appeared to have made satisfactory social and emotional adjustments and participated in extra-class activities. Goucher College (47) reported equally encouraging results in the three years of its early-admission program.

Summer Programs

There was more interest in summer institutes and summer honors work for high-school students. Cummings (23) reported on operation of an institute for high-school juniors at the University of South Dakota. Stetson University (94) described its summer program in mathematics for secondary-school students as part of an early-admission and advanced-studies program.

Trends and Needs

New dimensions were added to the articulation problem by the research reviewed. Greatly increased flexibility in high-school curriculums has introduced problems of multiple-learning rates and co-ordination of advanced-placement classes, honors programs, and the various tracks. Further dimensions appeared in the interrelationship of subject fields, an area now being explored in depth at experimental colleges such as Monteith and Michigan State-Oakland. Articulation between institutions and among units of the same institution received attention. Large state-college systems have studied the transfer problem, especially those systems with large junior-college populations. There seems to be little co-ordination between colleges and professional schools in the complex university, and difficulties result for students transferring from a college to a professional school.

In its new shape, the articulation problem stimulated examination of the total instructional program of later adolescence as a student-centered activity. Additional research is needed to measure more fully and accurately

the results of advanced-placement programs and other means of adapting the instructional process to the abilities and intellectual-emotional-social maturity of the student. Further work on independent study as a means of providing flexibility between available programs appears to be in order. The most pressing need, however, is for a successful formula of co-operation between public secondary schools and colleges to evolve close working relationships on course content, institutional objectives, and impact on student values. To date, the formal programs of co-operation between secondary schools and colleges have been largely among private institutions.

Conclusion

It is clear that considerable empirical and historical research is helping to define the problems of higher education and to survey existing practices. Though more study of this kind is required, there is particular need now for case studies and analyses in depth which will show how and why important adjustments can occur. For example, what kinds of forces actually affect student values and how? What liberal and technical competencies should students in a given field possess, and how can these be realized and brought to reinforce the others? What kind of graduate or professional preparation does the student find most essential as he moves into his first job? Can a continuum of development be drawn for typical students, specifying the responsibilities of formal education at each stage?

The greater concern with institutional research and self-studies which we now observe should help shape stronger educational programs in the future.

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CHAPTER VI

The Improvement of Instruction

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This is a golden age for research on improvement of college instruction. With financial support available from the Fund for the Advancement of Education, the U.S. Office of Education, and other sources, with increasing willingness of college administrators and (at least some) faculties to experiment with teaching procedures, and with new research instruments, the amount of research in progress is greater than ever before.

Lecture Versus Discussion

Television and independent study are the glamour methods of the decade, but comparison of lecture to discussion goes on. Prior to 1954, evidence about the superiority of the one over the other was inconclusive. It is still inconclusive; for example, Eglash (13), Ruja (38), and Casey and Weaver (9) found no differences in knowledge of content, but found more positive changes in attitude (as measured by the *Minnesota Teacher Attitude Inventory*) among students in small discussion groups as opposed to those taught by the lecture method. Many universities and large colleges utilize both lecture meetings and discussion-class meetings. The feasibility of this arrangement is supported by the findings of Warren (50) and Lifson and others (24), in whose examples discussion meetings numbered one-third of the total. Although no significant differences in achievement emerged, the partial-discussion method resulted in more favorable student attitudes, which persisted in a follow-up study two years later.

Comparison of lecture and discussion is related to studies of class size, since large classes are ordinarily taught by lecture. Rohrer (37) found no significant differences in achievement between large lecture sections and smaller discussion sections. At Miami University significant differences favoring small classes were found on measures of change in misconceptions in psychology on a case test of problem-solving in a marketing course and on measures of student attitudes toward all courses involved (27, 28).

Discussion Methods

One of the healthy trends has been to recognize that "discussion" is not a single method, but several methods. Several experiments compared different styles of discussion, with particular emphasis on student-centered or "democratic" methods. Birney and McKeachie (3) listed some of the

dimensions commonly involved in comparisons of democratic and non-democratic discussions.

Following the model of Lewin, Lippitt, and White's study of authoritarian, democratic, and laissez faire group climates, the University of Michigan's general psychology staff (16) compared three styles of teaching: recitation, discussion, and group-tutorial. The autocratic recitation method produced superior performance on the final examination, and also produced greater interest in psychology, as measured by the election of advanced courses in psychology. Students preferred it to the other methods. In a freshman orientation course Burke (4) found performance of students in conventional classes numbering 125 superior to that of students in co-operative groups of four to seven. Moreover, this difference generalized to other courses. Lyle (25) found performance of students in a conventional class superior to that of students taught by a problem-oriented method. Smith (40) and Krumboltz and Farquhar (22), however, studying methods which varied in degree of directiveness, found no differences in their effects upon student learning and ability to make "applicational transfer" of learning.

Determination of the best basis for grading is a special problem for the teacher using student-centered instruction. Haines (17) found no significant achievement advantages for students working co-operatively versus those working competitively for grades, but did find a marked difference in morale which favored the co-operative groups. Smith (42), however, comparing a lecture class to a "teamwork" class in which group incentives were used, did not find differences in satisfaction comparable to those of Haines.

Patton (35) observed results in two classes in which there were no examinations, no lectures, and no assigned readings. Students decided on reading to do, class procedure to use, written work to perform, and method of grading. In comparison with a control group, these students (a) believed the course more valuable, (b) showed greater interest in psychology, and (c) gave more dynamic and motivational analyses of a behavior problem. Obtaining individual measures of acceptance of responsibility in the experimental classes, Patton found in addition that the degree to which the student accepted responsibility was positively correlated with gain in psychological knowledge, gain in ability to apply psychology, rating of the value of the course, and interest in psychology.

The most impressive findings on results of small-group discussion came from research on the Pyramid Plan at Pennsylvania State University (6, 12, 36). The basic plan may be represented by the experiment in teaching psychology, though other subject-matter classes were also used. Each Pyramid group of psychology majors consisted of six freshmen, six sophomores, two juniors (assistant leaders), and a senior (group leader). One control group consisted of students who simply took pre-test measures; another control group devoted the same amount of time to lectures, films, and

demonstrations that the Pyramid groups spent in discussion. The results on such measures as attitude toward psychology, scientific thinking, use of the library for scholarly reading, intellectual orientation, and resourcefulness in problem solving favored the Pyramid Plan. Moreover, a follow-up study showed that more of the Pyramid students continued as majors in psychology.

Also supporting less directive teaching is Thistlethwaite's finding (45) that there is a significant *negative* correlation between a college's productivity of Ph.D.'s in natural science and its students' description of their teaching as directive. This fits with the general conclusion that discussion methods which are relatively unstructured may be effective in developing long-term motivation.

Laboratory Teaching, Project Methods, and Independent Study

Lahti's experiment on methods of laboratory instruction (23) found that a problem-solving method was superior to traditional laboratory-manual methods in teaching students to apply principles of physics to interpret phenomena. He also found a problem-solving method superior to more conventional procedures in developing ability to design an experiment.

Recent interest in independent study as a means of freeing faculty time for more efficient use has brought to the fore the project method of teaching. Novak (31) found that students in conventional college botany classes learned more facts than those taught by the project method, which was particularly ineffective for those in the middle third of the group in intelligence. Similarly, Goldstein (14) reported that students taught pharmacology by a project method did not learn more than those taught in a standard laboratory. Since presumably the real superiority of the project method should be revealed in measures of motivation and resourcefulness, measures of achievement such as those used in these studies are probably not adequate to determine the method's special strengths. Timmel (47), however, found no difference in the effectiveness of the lecture and the project methods in changing adjustment of mental-hygiene students.

With the support of the Fund for the Advancement of Education, a number of colleges experimented with more elaborate programs of independent study. Few differences in achievement were found between students working independently and those taught in conventional classes. Moreover, the expected gains in independence generally failed to materialize (1, 10, 26).

Findings from a child-development course by Parsons (33) and Parsons, Ketcham, and Beach (34) were more favorable to independent study. In both the earlier and the later experiments, students working independently made the best scores on the final examination, which measured retention of factual material in the textbook. The instructor-led discussion groups

were lowest in performance on the final. The authors explained their results in terms of the independent group's freedom from the distractions of examples, applications, or points of view opposed to those presented in the text. Thus, to learn facts from a text, independent study appears to be effective. Similarly, Craig (11) found that students who were given direction in discovering relationships learned more and retained the relationships better than students given less direction.

The most encouraging results with independent study were obtained by Gruber and Weitman (15, 52). University of Colorado students in freshman English, physical optics, and educational psychology who spent part of the class time meeting in groups independent of the instructor were superior to students in conventional classes in such outcomes as making difficult applications, learning new materials, and curiosity.

To sum up: independent study is not a panacea, and we still know little about the types of students, teachers, previous training, or objectives necessary for its success.

Television

The results of research on instruction by television indicate that there is little loss in student learning in courses taught by television as compared with courses taught conventionally (7, 8, 27, 28). At Miami University (27, 28) live teaching proved superior to TV teaching in three out of 26 courses; the reverse was true in one course. In economics TV proved inferior in producing gains in the ability to solve problems and synthesize. Purdue University also found television instruction inferior to conventional instruction in mechanical engineering, military science (19), and, on some tests, calculus (39). But in most comparisons in these studies television has proved to be only slightly, if at all, inferior to conventional instruction. When a course demands the demonstration of small objects or parts, the use of television or film should be advantageous; at Rensselaer Polytechnic Institute (46) teaching a course in strength of materials by television was found not inferior to conventional methods in teaching instrumentation and specimen behavior, but was found inferior in teaching theory and familiarity with machinery.

Factors Unimportant in the Use of Educational Television

The heading of this section would normally be "Factors Conditioning the Effectiveness of Educational Television," but the results of the research are indicated by the title chosen. At Penn State (7, 8) two-way communication between television classrooms and the studio was not superior to simple television reception. The New York University research staff (20) used student observers to classify television students into high-

middle-, and low-attention groups, and found attention level unrelated to achievement. Studies of television instruction and discussion revealed no significant differences in test performances of students taught by different methods. A poll indicated students preferred two hours of lecture followed by a full period of discussion to a short discussion each period.

Size of the viewing group is not an important variable in television instruction. Proctors in the viewing rooms do not contribute to learning. A course adapted to television by addition of supplementary visual aids proved to be no more effective than televised lecture-blackboard presentations. Both at Penn State and at NYU the "visual" productions tended to be *less* effective than "bare bones" television. At Miami University (27, 28) student ability generally did not make a difference in the relative effectiveness of television. The better students, however, ordinarily disliked television and large classes more than the poorer students.

Despite the preponderance of findings of "no significant differences," one is not justified in concluding that there is no loss when a class is taught by television rather than in person. When one examines the direction of differences in the studies of television teaching, they are surprisingly consistent. In 20 of 26 well-controlled experiments the "live" class was superior to the television class. This consistency gives statistically significant support to the conclusion that one should expect some loss in learning if television is substituted for live instruction. Nevertheless, the results are also consistent in indicating that television's inferiority is relatively small for the teaching of simple factual knowledge.

In summary: television seems to be inferior to conventional instruction in most college courses, but the decrement is not great.

Testing and Knowledge of Results

Tests provide knowledge of results, a major element in learning, and we would expect that the more information contained in the feedback, the greater its value. In a U.S. Air Force experiment (44) performances were better after multiple-choice tests were returned with information about why the alternative chosen was wrong and why the correct alternative was right. This technique proved superior to four other techniques (among them, the usual method of giving only total score) which gave less complete knowledge of results.

In a remedial English course at Purdue University (29) students whose 40 themes were evaluated in class made greater improvement on a test of English usage than a group which had workbook drill and whose 14 themes were individually corrected by the instructor. May and Lumsdaine (30) reported that learning from film is also positively influenced by participation and feed-back devices.

The teaching machine is a device for presenting questions in a predetermined sequence and providing immediate knowledge of results to an active

learner. Despite the theoretical advantages of teaching machines, there has been little conclusive experimental evidence on their effectiveness as compared with other teaching. Until studies currently underway are completed, Pressy's studies, begun in the 1920's, apparently still provide the major empirical support for self-testing devices.

Student Characteristics Related to Effective Teaching

Possibly one of the reasons why experimental comparisons result in nonsignificant differences between teaching methods is simply that methods conducive to optimal achievement for some students are detrimental to the achievement of others. When mean scores are compared, one method thus seems to be no different in its effect from others.

We have already noted some analyses of teaching methods taking such individual differences into account; for example, Guetzkow, Kelly, and McKeachie (16) found that students differing in intelligence or in preferences for teaching methods were not affected differently by three methods. Macomber and Siegel's results (27, 28) did not oppose that finding, but revealed a tendency for high-ability students to gain more in course-related attitudes in small than in large sections. They also reported a small superiority in achievement in television or large classes among those who held favorable attitudes toward the method used. Ward's results (49) also suggested that the ablest students benefit most from small groups. Comparing group-study and lecture-demonstration methods in a physical-science course, he found that the group method resulted in better achievement on a measure of understanding and problem-solving among the abler students. The poor students, however, benefited more from lecture-demonstration. Calvin, Hoffmann, and Harden (5) found that less intelligent students do more effective problem-solving in authoritarian than in permissive groups. These differences did not prevail among bright students.

Patton (35) found that the degree to which the student accepted responsibility was positively correlated with gain in psychological knowledge, gain in ability to apply psychology, rating of the value of the course, and interest in psychology. What sort of student will accept responsibility? Patton observed that the students who liked his experimental class and assumed responsibility were likely to be independent of traditional authority figures and high in need for achievement. Koenig and McKeachie (21) also found that women high in need for achievement preferred independent study to lecture. Something similar may be involved in the suggestion in the Oberlin College experiments with independent study (26) that students who are less rigid and less in need of social support are likely to profit relatively more from independent study than other students.

Since anxiety is generally believed to be increased by uncertainty, we would expect the anxious person to work most effectively in a highly struc-

tured situation. This hypothesis is partially supported by the research of D. E. P. Smith and others (41), who found that anxious students who were permeable (extroverted) did make optimum progress in a remedial reading course when taught by directive methods. However, impermeable, anxious students were unaffected by difference in teaching methods. A study by H. C. Smith (42) found, on the other hand, that students with high anxiety and low initial achievement gained more on achievement tests and were more highly satisfied in a "teamwork" class than in a conventional lecture.

An Air Force experiment (18) on teacher-student interviews also revealed complex interactions. Although the interviews were not effective over-all in influencing achievement, anxious students tended to be helped by interviews, whereas rigid students were more likely to fail if interviewed. The results were further affected by type of interview: when students were encouraged to complain, the interaction noted was produced; interviews oriented toward the student's goals and sources of satisfaction did not produce the effect.

Watson (51) found no difference in the effects of permissive and restrictive teaching methods on students who differed in authoritarianism and anxiety, as measured by achievement tests. Students' satisfaction, however, was affected by teaching methods: highest satisfaction resulted when teaching was by a method appropriate to the student's needs. Bendig and Hountras (2) reported that authoritarian students prefer a high degree of departmental control of instruction.

Stern, Stein, and Bloom (43) found that students high in a sort of authoritarianism were found to gain more when taught in a homogeneous group. Pace and Stern (32), studying the relationship between student needs and the forces affecting students in differing colleges, observed their College Characteristics Index and Activities Index to reveal great differences between colleges in such characteristics as the tendency to support the need for order or the need for achievement. Presumably the effects of variations in teaching methods interact not only with student characteristics but also with aspects of the college's culture. Inconsistent results may simply reflect differences in the cultures in which the experiments have been conducted.

In summing up the studies on the interaction of personality characteristics and teaching methods as they affect learning, it is safe to say that no major breakthrough has occurred. Fortunately, multivariate statistical techniques now permit precise analysis of the sort of complex interactions which appear to be involved in teaching. In addition to student characteristics, instructor characteristics and content characteristics probably also interact with teaching methods. For example, the U.S. Army studies of educational television showed some instructors to be more effective in that medium than in face-to-face teaching. Similarly, the experiments of Wakely and others (48) indicated that some teachers are more

effective with the abler students than with the less able ones, and other instructors are more effective in teaching poor students. Such interactions pose exciting problems for investigation.

Summary

Recent research on the improvement of instruction has not resulted in clear-cut conclusions about the relative effectiveness of varying teaching methods. There are many findings of no significant differences. There are some indications that results of the measures of high-level cognitive and motivational outcomes show discussion in small classes where problem-solving techniques are used is superior to didactic lecture in large classes. Instruction by closed-circuit television seems to be slightly inferior to conventional instruction for most outcomes. It is possible that high-level goals may be achieved through independent study, but this method by no means guarantees good results. Interactions between teacher characteristics, teaching methods, student characteristics, and other variables appear to be significant determinants of instructional effectiveness, and they are likely to become increasingly a focus of research.

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CHAPTER VII

Noninstructional Services

DANIEL D. FEDER and DANIEL J. SILLERS

A RECENT publication of the American Council on Education (18) lists the following college and university personnel services: selection for admission, registration and records, counseling, health service, housing and food service, student activities, financial aid, placement, discipline, special clinics (remedial reading, study habits, speech, and hearing), and special services (student orientation, veteran advisory services, foreign-student program, marriage counseling, and religious activities and counseling). Counseling services were discussed in a recent issue of the REVIEW (3), admission and selection are treated in Chapter II of this issue. These areas, therefore, are omitted from this chapter, which deals mainly with research in programs and evaluation of student personnel services.

Housing

The tremendous growth in research in housing and food services was reflected by Keegan's bibliography (40). The articles covered problems from residence-hall construction to food services, counseling programs, and housing for married students. The housing of married students on the campus brought changes in the style and units of construction, the controls necessary for families living contiguously, and the scheduling of activities of interest to families (24).

A bulletin of the American Institute of Architects (4) comprehensively summarized recent research in construction and assembled the ideas of architects, business officers, housing officials, and student-personnel administrators. Riker (53) drew data from the U.S. Office of Education files, interviews, questionnaires, personal inspection, and reports from the U.S. Housing and Home Finance Agency to develop a checklist of arrangements and facilities an institution should consider as it evaluates its building plans and the effects of facilities upon students.

Increased consideration was given to housing as it affects the student's educational and social development (23, 53, 63). Evaluation of counseling programs established in residence halls indicated that students who brought problems to residence counselors were largely seeking information—that they were concerned with housing regulations, academic rules and procedures, and interpersonal adjustment to dormitory living (16, 39).

Nevison (50) evaluated the differing perceptions of the counselor by the students and by the counselor himself. Both perceived the residence-hall counselor as a resource person, an aid in emergencies, and a stimulator

of residents' activities. They agreed also that the most important personality traits for counselors are emotional maturity, social poise, and friendliness. Walthall (68) found that graduate counselors established rapport faster and retained confidence longer than did undergraduate counselors. Griffeth (31) concluded that the type of housing facility has no effect on undergraduate women's achievement. Findings for men were not so clearly established.

The use of food-services facilities in the development of social skills of residents and as training laboratories for classes in institutional management was studied by West and Wood (69) and Riker (53). Gee (26) found that a single menu had no advantage over a multiple menu in relation to either cost or student morale.

Social and Extraclass Activities

Newly developed intramural sports programs were based on analysis of student needs (6), but many such programs seemed doomed to failure because of lack of financial support to carry on the diversified program necessary to meet those needs (29).

James (37) and Siske (60) found that social fraternities and sororities foster a democratic atmosphere. The least fulfilled objective of fraternal organizations was the development of a sense of responsibility to self and to the spiritual values in life. This finding was substantiated by Yardley (72) and Henderson (34). All concluded that social fraternities and sororities can, but do not always, make a worthwhile contribution to the over-all objectives of higher education.

Tinney (64) reported these trends in the educational role of the student union: (a) The work done by the student is for experience. (b) The union is used as a laboratory. (c) There is demand for higher standards of training and experience for the union staff. (d) There is need for the union to integrate more with the larger campus community. Minahan (47) found that—regardless of sex, place of college residence, or year of graduation—graduates who participated in the union program are more active participants in the life of their communities and are more active politically than graduates who did not participate.

Greenleaf (30) found that the number of leaders in student activities increases as enrollment increases, but the percentage of leaders in relation to the whole student body decreases. Through counseling it was possible to limit the overparticipation of the few and spread out participation, without the need for rigid mechanical regulations.

Murray (49) found that the areas of greatest tension as perceived by students are, in descending order: (a) registration lines, (b) eating facilities, (c) student-faculty relationships, (d) scholarship, (e) dormitory regulations, (f) boy-girl relations, (g) popularity polls, (h) sorority-fraternity affiliation, (i) skin-color difference, and (j) car parking.

Financial Aid and Student Employment

The increasing part that the college or university plays in assisting students financially is reflected in the *Second Report to the President* on education beyond the high school (52) and in the Rockefeller report on education (54). Up-to-date information on the availability and extent of scholarships, fellowships, and loans is dispensed by both public and private agencies (19, 35, 44, 70). Babbidge's manual (5) provides complete guidelines for student-aid officers and an excellent bibliography.

Superior scholarship and greater participation in activities by students who are free from immediate financial pressure were observed (13). Two studies (11, 65) reported no significant differences in grade averages between working and nonworking students. In coeducational institutions with enrollments of fewer than 2000, all financial aid is most often under the direction of the student personnel office (9). Most of the reporting institutions had not developed a policy regarding the place of part-time employment in the educational program.

Placement and Follow-up

Little program research in placement was published. Brown (10) found that 27 percent of college graduates were working in their chosen vocations; another 27 percent were in jobs unrelated to their vocational choice; 10 percent were unemployed. Christensen and Swihart (12) found all women graduates wishing eventually to marry, but 62 percent believed they should work in order to capitalize on their college education.

Health Services

Despite claims that important functions of health services are to teach, protect, and promote health, Felton (20) found only a minimum of teaching being carried on. Henderson (33) reviewed a number of cases involving legal problems in relation to obtaining consent for treatment, and believed the blanket-consent authority for students entering school to be insufficient. Failure to supply the patient with all pertinent information about a contemplated procedure as a basis for decision invalidates his consent.

Religious Activities and Counseling

There was increasing awareness of the part of religion in the educative process (2). Ferm (21) found only two departments of religion in state universities in 1927, but by 1956 there were 30 such departments. Funk (25), Gilliland (27), Jacob (36), and Lagey (42) concluded that student attitudes were changed toward a greater humaneness, and saw an increase

in church membership. Mott's findings (48) indicated greater need on the part of institutions for religious orientation. One growing approach (43) is the introduction of religious values into subject-matter presentations.

Scarborough and Wright (55) found that a university's religious-emphasis week increased students' interest in religion but had no lasting effects on their philosophy or understanding. Jansen (38) reported the abandoning of compulsory religious convocations in Catholic colleges for men. He noted the development of greater permissiveness in student-affairs administration. Taylor (62) contended that religious counselors, because they are trained primarily as religious thinkers, should co-operate with counseling and personnel workers rather than attempt independent operation.

Orientation

A number of surveys attempted to determine the effectiveness of programs designed to help the student adjust to the experience of college (15, 28). Zander (73) found an orientation-camp program effective in helping students to understand the objectives of higher education. A recent trend moved orientation to the high-school or precollege clinics. Lowenstein and Hoppock (45) believed such early effort effective in improving grades and adjustment to school, and believed it helped those who should not attend college to choose their goals. Stone and West (61) found that some tests given during orientation week do not give a true picture of the student.

Other Services

Feder and Ross (17), surveying research in psychological services, noted the widespread acceptance of psychological services on the college level as a unique aspect of American higher education. They were critical of the paucity of program research even in the more highly professionalized areas of psychological functions. No additional significant program research has been published since their survey.

Adams (1) surveyed nationally the programs and operations of reading clinics sponsored by teacher-training institutions. Kingston and George (41) found special-reading training valuable to students other than those diagnosed as needing it. Blake (7) found compulsory study-skills courses for probationary students to be beneficial. Given as noncredit courses in most colleges, the courses were believed helpful by a majority of students. Little research has been done with study-skills programs, and they have grown up because of demands from increased enrollments.

Condon (14) concluded that special facilities for the physically handicapped in colleges are generally inadequate.

In a study of student disciplinary programs at 10 universities, Truitt (66) found it desirable that students, administrators, and faculty partici-

pate jointly in the operation of a disciplinary program. Student personnel officers were agreed that the over-all function of the program should be preventive and remedial, such agreement marking a distinct change in philosophical orientation.

Evaluating the educational programs for foreign students, Bohn (8) found them unable to match American students in many of the abilities necessary for efficient class work. Schuiteman (56) studied Colombian nationals who attended U.S. colleges and found that their purposes for studying in the United States were fulfilled, that they had realigned themselves to their homeland and had improved occupational status, and that their worst impression of the United States was of race prejudice and discrimination.

Evaluation of Student Personnel Services

Interest in program research in student personnel services increased. Hage (32) reduced the *Rackham Student Personnel Services Inventory* from 848 items to 328, and obtained a correlation of plus .96 between the revised version and the original.

Fitzgerald (22) and Shaffer (57) found that faculty perceptions of student personnel programs are based on the relationship of faculty members to such programs and their knowledge of them. Shigley (59) saw need for more effective communication originating in the student personnel offices. Mahler (46) found that faculty reactions to student personnel services were more favorable than reactions of students. Shannon (58) found a strength of church-related colleges to be recognition of the individual, although inadequate finances left special services lacking.

Vogel (67), studying colleges' concepts and practices in allocating student personnel responsibilities, found student personnel administrators generally believed that the "personnel point of view" requires integration of all factors involved in the student's educational experience. Sharp divisions are usually made among academic, business, and personnel functions, and wide differences obtain in the patterns by which personnel functions are integrated or co-ordinated.

Summary

Little research in student personnel services amounts to more than the surveying of the most common or "best" practices. The need is to find ways of improving operational effectiveness. Differences in psychosocial "climates" as reported in Chapter III suggest that a variety of factors may be at work in any given situation. To evaluate such factors under conditions which will permit the control of significant variables requires research design of the type suggested by Pepinsky (51), which takes account of observable antecedent conditions and mediating conditions, and evaluates in terms of observable consequences.

There is little evidence as to the validity of certain stereotypes of organization and function which have been adopted in student personnal practices. More research with controlled experimental groups or study of similar institutions with some variation of program should be carried on in order to validate the assumptions under which present programs are operating. Determination of what constitutes "best" practice includes not only the influencing of student attitudes but also faculty acceptance of programs.

The tendency to lean heavily on surveys of practices may in itself stifle organizational and operational experimentation. The unevaluated acceptance of majority practice may superimpose a structure or function which may not be in keeping with the nature and needs of the institution's faculty and student body. In this very trend may lie the cause for the absence of reports of significant departure from established patterns of student personnel services.

Although there appears to be substantial evidence of change in attitude of students toward traditional college-life patterns (71), there is not concomitant evidence of changing patterns of related services. The presumed values of student government and other extraclass activities have not been sufficiently analyzed. Whether decreased student interest in these functions is due to heavier academic pressures, changing perceptions of needs, or general dissatisfaction with the values derived has not been determined. Similarly, whether conscious restructuring of such aspects of campus life would alter their values has not been tried under conditions of controlled experimentation.

Promising evaluative technique is the effort to gauge the perceptions of students and others of the service programs and their operations (22, 57). This methodology makes it possible to determine "anchor points" against which the effects of changes in programs or operations may be measured. Such studies also may provide bases for determining steps to correct misapprehensions concerning services or may indicate changes required to meet changes in clientele needs.

The increased awareness of the need for evaluative study of program operations may be a sign of increased security of student personnel workers in the higher-education complex. It also appears to be a correlate of the increased numbers of professionally prepared persons who have entered the field in the last decade. With professional preparation, inevitably they would tend to question the validity of practices which are neither based on data nor pragmatically evaluated.

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CHAPTER VIII

Evaluations of Institutions and Programs

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EVALUATION of colleges and universities, and of their programs, has received considerable attention since Pace and Wallace's discussion (42) in the REVIEW. The establishment of bureaus of institutional research, the support of institutional self-studies by the Fund for the Advancement of Education, the review of accreditation procedures, and the growing concern about quality in higher education have all contributed to a heightened interest in institutional evaluation. Although the actual results achieved thus far are not impressive, the current interest in, and support for, institutional evaluation bode well for the decade ahead.

Problems of Evaluation

Evaluation is difficult and involved. First, the dimensions or facets of quality to be evaluated must be decided. Is a college to be judged by the caliber of students which it enrolls? By changes (intellectual, personal, attitudinal) produced in students? By the quality of its teaching? By number of Ph.D.'s on the faculty? By the number of books and articles its faculty has published? By achievements of alumni? By the size of the endowment fund? By its age and traditions? Before evaluation is attempted, decisions must be made as to which of these dimensions are crucial. Most educators would probably agree, in theory, that an institution should be judged by the quality of its products. In practice, however, this is not the approach most frequently employed.

Once the dimensions of quality have been agreed upon, the next problem is to choose techniques or devices to measure these dimensions. Is student aptitude to be measured by psychological tests? Is student achievement to be measured by standardized achievement tests? Are student opinions to be employed in the assessment of teaching? Is alumni success to be measured by amount of salary earned? As is well stated by Stecklein (60), judgment must be exercised in determining the best techniques of observation or measurement which are to be employed—but these judgments are not easy to make.

After measurements have been obtained, the task is to interpret data. If the average rank in high-school graduating class of a group of entering freshmen is 75—is this average, high, or low? If the average number of articles which has been published by faculty members of a college is two—is this number normal? If 5 percent of the graduating seniors of a college go on to graduate school—is this the proportion to be expected?

These and many other questions are difficult to answer without normative data. If normative data were available by type of institution, by region, and by type of financial support and control, the interpretation of ratings and test scores and other statistics would be facilitated.

The process of interpretation needs, in addition to normative data, information about the quality of student input. Holland (25) pointed out that the records of some institutions in producing scholars and scientists are probably attributable as much to the abilities of students as to the quality of the educational experiences provided by these institutions. McConnell and Heist (32) observed evidence that colleges and universities differ in terms of the personality characteristics of their students. These student differences, intellectual and personal, affect the quality of the end products and hence must be considered in any program of institutional evaluation.

Finally, it is imperative to consider the institution's objectives when evaluating its performance. This point was stressed by Bloom (5), Pace (41), and Hagen and Thorndike (19). Even among colleges of the same general type (for example, liberal-arts), there are differences in objectives. For this reason evaluation must be conducted within relatively homogeneous types of institutions if fair and meaningful comparisons are to be made. And it should go without saying that, before evaluation can begin, there must be clear-cut statements of institutional objectives.

Existence of these problems was made evident by various studies. Stuit, Helmstadter, and Frederiksen (66), reviewed and analyzed college evaluation problems, methods, and needs for the following areas: institutional objectives, the curriculum, the faculty, the student body, student personnel services, and comprehensive or over-all evaluations.

Both the general problems of evaluation in higher education and the specific problems in such fields as critical thinking, communications, the humanities, the natural sciences, and the social sciences were discussed in a conference at Florida State University (36). It was pointed out that measuring the performance of an institution differs from measuring the performance of individuals, since changes in groups can be more reliably measured than changes in individuals.

Dressel and Mayhew (11) dealt with the problems involved in constructing tests to measure outcomes of instruction in general education. (Fuller discussion of the study appears under the heading "Co-operative Studies" in this chapter.) Pattillo (43) pointed out some of the confusion which exists regarding the use of qualitative versus quantitative standards in evaluation.

In addition to difficulties of measurement, communication is a problem. A number of colleges and universities make studies deemed to be primarily of local interest and do not publish the results. The Office of Statistical Information and Research of the American Council on Education (1), however, reported some such research, and Hatch (22, 23) edited a series of

reports for the U.S. Office of Education summarizing research at various institutions. These publications should be increasingly helpful in aiding communication.

Accreditation

A function of accreditation is to establish and define appropriate criteria and to apply these criteria to individual institutions or programs of study. *Accrediting of Colleges and Universities in the Coming Decade* (64) pointed out that accrediting, as presently practiced, is not immediately concerned with identifying the fraudulent or with recognizing excellence. Primarily, accreditation is concerned with distinguishing between the competent and the "not quite competent." The accreditation of an institution, therefore, implies acceptable performance—not necessarily (indeed rarely) superior performance.

Accreditation as a "force" in American higher education was studied by a number of persons and agencies. The history of accreditation, its problems, and its contribution to higher education were fully discussed by Selden (53). Nevins (38) described in detail the accreditation policies and evaluation procedures of the six regional accreditation agencies. Forbes and Burns (16) observed change from emphasis on policing to a program of service. Blauch (4) collected discussions of the existing accrediting agencies and the six regional associations. Armsby (3) discussed accrediting problems, with special reference to engineering.

The findings of an accreditation examination for a particular institution are usually available only to the institution itself and the accrediting agency. A conference on issues in accreditation (64), sponsored by the National Commission on Accrediting, recommended that accrediting agencies consider publishing their ratings of institutions. Selden (54) reported debate among representatives of accrediting agencies aroused by this recommendation. In a panel discussion at a later meeting, Reinert (47) proposed publication of more precise, objective data which would present to the public the differences among institutions. At present, however, evaluation by accrediting groups is of the "all-or-none" type; in this sense accreditation appears to be a crude form of evaluation.

Evaluation of institutions by accrediting agencies does not result in clear-cut distinctions between accredited and nonaccredited. Hill (24) compared, on 10 different factors, seven recently accredited colleges with seven nonaccredited colleges holding membership in the Council for the Advancement of Small Colleges. The differences on these 10 factors between the accredited and nonaccredited were not striking. In general, colleges with large physical plants and endowments and large annual gifts were favored over those financially less fortunate. Students in the nonaccredited colleges did slightly better in the Graduate Record Examination than those in the accredited colleges.

The chief data-gathering and measurement techniques of the accrediting agency are the personal interview and the questionnaire as employed by visiting teams. A questionnaire-type study by the Committee on Research and Special Studies of the Western College Association (68) found that 24 percent of institutions recently visited commented on weaknesses in the accrediting team. Variation in background of members of visiting teams and lack of adequate preparation for a visit were the criticisms most frequently made. The institutional self-study as a part of the accreditation process was endorsed by 82 percent of the respondents, but nearly half indicated some degree of dissatisfaction with the total accreditation process as now carried on.

A major need appears to be development of more objective techniques in evaluation and of norms of performance for the interpretation of findings. Discussing problems encountered in the accreditation of the liberal-arts college, Stuit (65) proposed early consideration of the construction of a test battery to measure the major intellectual outcomes of a liberal education. Tests, of course, are not the whole answer to problems of accreditation, but research on the validity of techniques and procedures currently used seems to be urgently needed.

Surveys

The last six years saw publication of a number of surveys of higher education. Many were state-wide and concerned primarily with estimating the capacity of existing colleges and universities to accommodate increased enrollments during the years ahead, and with the definition of each institution's function (6, 7, 17, 26, 28, 31, 44, 51, 52). Hollis and Martorana (27) conveniently summarized survey studies completed or under way in each state prior to 1956.

Surveys were made of curriculum problems and of personnel policies in higher education. For example, Stickler (62) reported the opinions of educational leaders on important developments in general education during the past third of a century and solicited predictions of the most important and likely developments during the next third of a century. One of the chief findings, based upon 107 replies to a letter of inquiry, was the belief that general education will continue to develop, to consolidate gains, and to solidify its position in American higher education. Sullivan (67) visited a number of colleges and universities to study administration-faculty relationships. He observed that the "one-man show" in higher education is disappearing and that the administrative process is being actively studied. Newburn (40), by visits to 11 universities, investigating faculty personnel policies, presented some interesting and challenging observations on appointment, promotion, and retirement policies and their impact on the institution. Eells and Martorana (14), studying curriculum changes which occur when two-year colleges become four-year colleges,

found a substantial decrease in terminal offerings. They also reported (15) that expansion of two-year colleges to four-year colleges is not as prevalent as has been believed.

Dressel (10), from data obtained at Michigan State University, in Arkansas, and from the Cooperative Study of Evaluation in General Education, found students quite favorable to general education and not as vocationally oriented as some writers have described them. The overlap between high-school and college courses, poor teaching in some general-education courses, and the survey approach, as used in such courses, account for some of the negative reactions to general education.

Ratings of Institutions

One of the most widely publicized evaluations of colleges and universities was made by Manly (35) of the *Chicago Tribune*. The technique used was to ask prominent educators to list in rank order the 10 best universities, 10 best coeducational liberal-arts colleges, the 10 best men's colleges, and the 10 best women's colleges. The definition of "best" was left largely to the educators. The *Tribune* reported a high degree of unanimity of opinion among educators about the rank order of institutions in each category and asserted that the rankings are supported by objective data.

The confidential ratings of departments reported by Keniston (30) were reminiscent of an earlier study by Hughes (29). Keniston's procedure was to ask department chairmen in 25 member institutions of the Association of American Universities to rate the strongest departments in their respective fields (arranged roughly as the first five, second five, and third five) on the basis of the quality of their Ph.D. work and the quality of their faculties as scholars. Composite scores for departments in each university were computed. Next, departmental scores were combined to determine divisional scores for the biological sciences, humanities, physical sciences, and social sciences. Finally, over-all ratings of the graduate work in these institutions were made and compared with the earlier ratings of Hughes.

Studies of the sort made by the *Chicago Tribune* and by Keniston are subject to serious limitations. In the words of Keniston, the ratings "depend on highly subjective impressions; they reflect old and new loyalties; they are subject to lag, and the halo of past prestige." Obviously, however, people responsible for these studies must have believed that they have merit. This may be a fact, but if evaluations of this sort are to be made, it is regrettable that the best techniques are not employed. Both the *Tribune* and the Keniston studies could have been strengthened by use of the best rating procedures available instead of reliance on general, loosely defined impressions. Failure to give precise instructions to the raters, to recognize differences in purpose and emphasis of institutions, and to seek out objective indices are serious lacks of these studies. Although one cannot "quarrel" with the list of distinguished institutions which resulted, one is

prompted to ask: If it was worth doing, why not employ the best available research methodology?

A form of institutional evaluation based upon the quality of product was developed as a part of a study conducted by Clark (8) to identify factors characterizing "significant contributors" to psychology. In one phase of the analysis, the total numbers of Ph.D.'s produced by leading departments of psychology were listed along with the numbers of significant contributors graduated from these departments. The numbers of present faculty members who are themselves significant contributors were also listed. Despite some obvious limitations (for example, differences in size of departments and quality of student input), Clark's technique seems to offer promise.

Surveys of Professional Education

Several surveys or general evaluations of professional education were completed. Although these studies are largely of the armchair variety (as opposed to the experimental), their conclusions and recommendations may lead to more precise examination of problems.

Pierson and others (45) questioned 587 institutions about faculty, curriculums, and students. The striking aspect of their study, however, is its criticism of the proliferation of courses in business education, particularly at the undergraduate level, and the consequent overspecialization. The result is a general recommendation that undergraduate business education concern itself with the study of fundamentals and with general or liberal education, and postpone emphasis on specialties to the graduate level.

Gordon and Howell (18), in a study sponsored by the Ford Foundation, analyzed business education, and included a survey of business firms, to determine their use of college graduates. The curriculums of business schools were studied by examining college catalogs. The findings were similar to those of Pierson and others (45), namely, that business education needs upgrading; that too many specialized courses are offered, at least at the undergraduate level; and that the quality of students, of teaching, and of research should be improved. These two studies should have impact upon schools of business and should stimulate research on education for business and industry.

The American Society for Engineering Education's report (2) analyzing present practices in engineering education should be useful to engineering faculties performing self-studies. Wilcox (69), studying the relationship of professional to liberal-arts content in journalism education, found the over-all ratio of courses approximately two to one. Russell (49), investigating the balance among professional, supporting, general, and elective courses in nursing education, found the 50 to 50 ratio between liberal-arts and professional courses, often advocated on theoretical grounds, difficult to maintain in practice. Stewart and Dixon (61), studying Oberlin College

students who went to medical school and using as a point of departure the recommendations of Severinghaus, Carman, and Cadbury (55), found no evidence to indicate that the premedical science majors at Oberlin slighted the liberal-arts content by pursuing a major in premedicine or that they did less well in medical school.

Dressel, Mayhew, and McGrath (12), examining the views held by professional-school faculty members regarding liberal education, observed that, although professional-school faculty members favor study of the liberal arts in principle, in practice they tend to give preferred status to liberal-arts subjects which are allied to their professional fields. McGrath and Russell (34), analyzing the catalogs of 50 small or medium-sized independent liberal-arts colleges, observed that more and more professional content has crept into the liberal-arts curriculum. They cautioned that alertness will be required to avoid narrowness in the development of undergraduate courses which have a vocational, as opposed to a liberal, purpose.

Self-Studies

The greatest effort in institutional or program evaluation during the past six years was in the category of self-studies. The range of these studies as to purpose, procedures, and general value of findings is wide. Donaldson (9), summarizing the findings of 38 studies of the aims and methods of liberal-education grants from the Fund for the Advancement of Education during 1952 and 1953, set forth the strengths and weaknesses of self-studies and listed some of the outcomes evident in the continuing educational program on each campus.

The approaches used and problems investigated in self-studies take on a considerable measure of uniqueness. Spearman (59), reporting a conference of 200 faculty members from the three divisions of the Consolidated University of North Carolina, discussed undergraduate instruction, research and graduate training, student-faculty relationships, and the function of the university in service to the state. McEwen and Synakowski (33) described a Hamilton College study of the desirability of increased enrollment, paying particular attention to implications for the curriculum. Quality of teaching was emphasized by studies at Goddard and Allegheny Colleges, reported respectively by Hamlin (20) and Pommer (46).

One of the most detailed self-studies was that of New York University (39), in which 400 members of the faculty and administration participated and to which several outside authorities contributed extensively. The procedures employed were: (a) critical review by committees, (b) evaluations of aspects of the university's educational program by students, and (c) discussion in a series of conferences. There were, however, no systematic appraisals of student performance or of alumni achievements. The self-study recommendations touch nearly every aspect of the university's life—educational, administrative, and physical. The techniques employed

in the study are not unique, but the intensiveness and extensiveness of the project are worthy of note. As part of a University of Pennsylvania study, Shryock (56) interviewed members of the faculty to assess morale. His report went well beyond an analysis of the University of Pennsylvania and extensively discussed achievement of excellence in higher education, giving attention to recruitment, promotion, tenure, retirement, and financial rewards for faculty. The recommendations are worthy of consideration by educators generally.

Eckert and Keller (13) edited condensed reports of 23 studies at the University of Minnesota, from 1942-52. The findings and implications regarding operations studied included the undergraduate program, specialized and graduate education, staff activities, and general education; the technique employed was analysis of records, questionnaires, interviews, and tests. Particularly to be noted are follow-up studies of former students in the College of Science, Literature, and the Arts and of University of Minnesota Ph.D.'s. The report is especially noteworthy because it presented findings from a program of institutional research which is among the oldest and most extensive in American higher education.

Stroup (63), along with Donaldson (9), raised the question of the worth of self-studies, citing as advantages the increased attention to purposes, activation of ideas, and encouragement of co-operative interdepartmental thinking, and at the same time pointing out that making a sound self-study is not an easy task. Pace (41), basing his discussion on the self-study at Syracuse University, observed that a self-study requires (a) careful planning, (b) involvement of a large segment of the faculty, and (c) assistance of specialists in educational research. Russell (50) emphasized the merits of using an agency in self-studies, stressing the fact that it can provide comparative or normative data and independent judgments.

One is inclined to agree with Pace (41) that the field of self-studies lacks "a general theory, design, and methodology." These inadequacies should receive the prompt attention of researchers if self-studies are to be worth the effort they require.

Co-operative Studies

Dressel and Mayhew's study (11), sponsored by the American Council on Education assisted by the Carnegie Corporation, was concerned with the evaluation of general education in six areas: social science, communications, science, humanities, critical thinking, and attitudes. Fifteen institutions participated. The chief contributions were in methodology. First, the report described fully the problems involved in the construction of evaluation instruments, and especially emphasized the importance of defining objectives, critical testing of the methodology adopted, and relating test results to other scores. Second, it described the measurement of gains during stated periods, along with the possible effects of different

methods of instruction and different teachers and of institutional differences. Third, it candidly stated the problems of evaluation, describing successes and failures experienced in the course of the study. Finally, it made suggestions and presented hypotheses which may help investigators, and encouraged experimentation and co-operative effort among institutions.

The Dressel-Mayhew report presents the type of approach which should receive more attention in the broad field of institutional evaluation. If evaluation is to be undertaken seriously, instruments will have to be constructed after the pattern described, for the problems encountered will be similar to those which confronted Dressel and Mayhew and their committees.

A co-operative study of 341 liberal-arts colleges' output of Ph.D.'s in chemistry from 1936 to 1956 was carried out preliminary to the Wooster conference on research and teaching in liberal-arts colleges (48). Those which produced 30 or more Ph.D.'s during the two decades were classified as very productive; 15 to 29, productive; 5 to 14, borderline; 4 or fewer, unproductive. Special questionnaires were sent to a sampling of 30 colleges in each of the four categories, and a less detailed form of questionnaire was sent to the remaining 221 institutions. The very productive colleges were found to have the best-prepared faculty members, largest student bodies, lowest course loads, best library and laboratory facilities, and greatest professional interest on the part of faculty members, and they were carrying on more research in chemistry.

The Wooster study called attention to several factors which appear to bear on the chemistry Ph.D. productivity of liberal-arts colleges. It had, however, two serious shortcomings. First, adequate consideration was not given to differences in enrollment. The number of Ph.D.'s produced per thousand graduates would seem to be a better criterion measure. Equally important, no adjustment was made for differences among colleges in quality of students. It is reasonable to believe that high productivity can be explained by high aptitudes of the students that colleges enroll. It would be advisable to repeat the study, equating the schools with respect to students' ability level.

General Criticism

The present chapter has so far reviewed only statistical or experimental studies.

A number of articles analyzed critically many of the current practices in higher education, and some its basic philosophy. Smith (57, 58), for example, called attention to the lack of real educational contact between students and teachers or between administrators and students, and to the exaggerated emphasis on marks. He deplored especially the fact that many professors engage in unimportant research and therewith find no time for students except in a huge lecture hall, where contacts are of necessity highly impersonal. Mills (37), in a somewhat different vein, emphasized

the importance of research to good teaching and suggested ways in which research might be fostered in the small college. Harris' observations (21) were similar to those of Smith. Although the statements of Harris and Smith are to some extent personal, their criticisms must be taken into account by anyone who is seriously concerned about the quality of higher education.

Summary

A striking development in institutional evaluation was the interest in self-studies, prompted by concern about quality of higher education, the need for long-range planning, and the support of philanthropic foundations. It seems likely that the results were useful to the individual institutions, but it is also evident that the findings were not widely applicable. Better co-ordination in the making of self-studies is needed.

The concern of institutions and accrediting agencies about the validity of accrediting procedures and the role of accrediting in institutional improvement augurs well for the future. Accrediting agencies are in a strategic position to encourage self-studies and to help interpret their findings. In addition, the time has come when accrediting agencies should carefully study the validity of their own procedures and launch studies looking to the improvement of accrediting practices. The need is urgent for bold and imaginative research on accreditation.

Publication of a number of state-wide studies of higher education indicates growing concern about the ability of existing institutions to meet the needs of society for college-educated citizens. Such studies have resulted in clearer definition of function for some institutions. Taken together these studies should result in positive steps to serve the needs of youth in higher education.

The studies reviewed here indicate a lively degree of interest in evaluation and at the same time point up the many problems to be faced. It is encouraging that faculty members, administrative officers, laymen, and students are concerned about the quality of higher education. Such a concern means that research will probably be aimed at solving measurement problems. Research needs are summarized by Stuit, Helmstadter, and Frederiksen (66) as follows: (a) evaluation instruments, such as achievement tests, which measure educational outcomes not well measured by presently available tests; (b) better normative data for interpretation of results from available tests and new normative data for new instruments where appropriate; (c) better understanding of how to organize and direct evaluation; and (d) better definition of good practice in certain aspects of the educative process, such as teaching and counseling.

As yet one cannot say that great things have been achieved in institutional evaluation. In addition to the technical problems already listed, there are the problems of complacency over the quality of higher education

and skepticism as to the workability of new, objective techniques in institutional evaluation. In some cases the skepticism becomes hostility because of a fear that evaluation may disclose "skeletons in the closet" or may interfere with the freedom of an institution in deciding its curriculum and teaching practices.

Concern about the quality of higher education, particularly in science education, has brought forth some searching questions about present practices and procedures of instruction. Some of these questions cannot be answered, because little attention has been given to serious evaluation of institutions. Perhaps one benefit of the present concern about quality will be stimulation of research on institutional evaluation.

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CHAPTER IX

Government, Administration, Co-ordination, and Financing of Higher Education

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RESEARCH in the areas considered here can only rarely employ controlled experimentation; the literature of the field is built upon descriptive, analytical, comparative, historical, philosophical, survey, and other techniques, including the autobiographical.

To afford at the outset a sense of balance and emphasis, we note a few of the pertinent books appearing during the last six years: those by Carmichael (11), Clark (15), Donovan (23), Glenny (30), Henderson (35), Henninger (38), Keezer (44), Medsker (49), Moos and Rourke (52), Perkins (59), Stoke (68), Woodburne (73), and Wriston (74); also the reports of the President's Committee on Education Beyond the High School (60), the Educational Policies Commission of the National Education Association (53), and the Committee on Government and Higher Education (18). The period immediately preceding 1954 was treated by Henderson and Jorgensen (36) in an earlier number of the REVIEW.

Above the Institutional Level

Higher education is a function of society sometimes regarded as a responsibility of governments, although a part of the task is permitted to be assumed by private agencies which are traditionally given a large measure of autonomy. Support of state universities and colleges, and encouragement of private institutions, is a well-established obligation of the states and will continue to be. It has also become a concern of the federal government. More support for higher education comes from local governments, too, as the number of junior colleges increases; and for decades many cities have maintained municipal colleges and universities. Practically all the 3000 counties in the United States contribute to the support of land-grant institutions by sharing maintenance of the federal-state-local co-operative agricultural extension service.

There is a place for research in the manifold relationships between higher education and the three levels of government. The chief recent work in this area is that of the Committee on Government and Higher Education, whose lucid and unequivocal report (18) recommended that the state-supported institutions of higher education be substantially relieved from much of the strait-jacketed fiscal control from the state capitol now widely exercised over their pre-auditing of expenditures, purchasing, management of real property, custody of institutional funds, printing,

internal budgeting, personnel practices, and other essential functions in which noneducational central fiscal officers of the states now often have too heavy a hand. This conclusion was backed by the findings of Moos and Rourke (52), whose nationwide investigations disclosed many examples to demonstrate that too-tight fiscal controls at the statehouse are inconsistent with efficient institutional management, inimical to morale, and destructive of the spirit of freedom which is essential in higher education.

Glenny (30), studying the co-ordination of state-supported institutions in 12 states, tacitly concluded that a formal, statutory, state-wide agency of co-ordination is preferable to a plan of voluntary liaison, though he disavowed advocacy of any "model" form of administrative organization at the state level. The Educational Policies Commission (53) recommended institutional co-operation, asserted that "the voluntary character of such cooperation is an established principle of higher education," and advocated state-wide and regional co-ordination among public institutions. The President's Committee on Education Beyond the High School (60), predicting an expansion of higher education that would exceed the goal set by the similar Truman Commission in 1947, proposed that communities consider the two-year college, co-ordinating community planning with state and regional planning.

Two histories of important administrative aspects of higher education in New York appeared: Abbott's history of the Regents of the University of the State of New York from 1784 to 1949 (1) and Carron's history of the little-understood genesis and relationships of the state-supported colleges adjacent to Cornell University (12).

The character and development of colleges and universities in the United States are considerably influenced by voluntary accrediting agencies at the national, regional, and state levels. Blauch's valuable compendium of factual articles on these activities (6) included a tabular summary of the accrediting agencies of 29 professions as of the end of 1957. The proliferation of accrediting agencies eventually led to the creation of the voluntary National Commission of Accreditation, intended to promote a degree of consistency and coherence in the field and to balance and harmonize demands of the numerous specialized groups. This story was told by Selden (67).

State-wide Surveys of Higher Education

A landmark in the history of state surveys was the California *Restudy*, reported by Holy, Semans, and McConnell (41), for the Liaison Committee of the Regents of the University of California and the State Board of Education. This report testified to the success of this voluntary agency since 1945 in devising and building up California's tripartite system of higher education and made recommendations of wide significance, some of which were implemented by the California legislature in 1960 and earlier.

Another comprehensive state survey was that of Florida, reported by Brumbaugh and Blee (8), which emphasized the need for development and expansion of higher education in a state of rapidly growing population. Brumbaugh and Chandler (9) also surveyed state-supported higher education in Louisiana, stressing organization and development. Higher education in Michigan was studied by Russell (66), who reported demographic data demonstrating the need for new junior colleges, but gave little attention to advanced graduate work in Michigan's three major universities. The only graduate professional field studied was medicine. Critics asserted that the Russell report did not take adequate account of differences among the several institutions on a vertical scale, both as to academic and professional levels and as to levels of quality. Without these distinctions, comparative unit costs are of severely limited meaning and may mislead the uninitiated.

Administrative Theory and the Education of Administrators

Discussions of administrative theory increased among political scientists, psychologists, sociologists, and group dynamicists. Since a forthcoming issue of the REVIEW will be devoted to the literature of administration, only those discussions dealing with higher education have been reported here. Litchfield, for instance (47, 48), discussed administrative theory and applied it to the large university.

Comparative aspects of academic, governmental, and business administration were presented in a symposium by Corson (21), Dodds (22), Henderson (34), and Cleveland (17), organized and introduced by Perkins (58). Perkins found too little attention hitherto given to the university as a social organism and as an administrative entity. Corson (21) observed that faculty members are professionals who "expect the right of self-direction in their work," have more voice in operational affairs than do employees of analogous rank in business and governmental enterprises, are less under the domination of "customers," and produce a service less tangible.

Dodds (22) sagely recommended in the symposium that a university president's prime responsibility be regarded as educational leadership, and that he must resist ceremonial duties, limit his public appearances, and delegate details of administration. The faculty must "accept the limitations of direct democracy in complex organizations,"—not at all incompatible with retaining their professional discretion and rightful prerogatives. Henderson (34), observing that most college and university presidents are appointed from faculty ranks, generally without prior preparation or experience other than as deans or department chairmen, saw need for broader preparation and better selection processes, and saw a beginning of both education and research toward those ends at a few universities.

Examining the predicament of the college dean as an administrator, Cleveland (17) found him no more than a leader among equals, and found the "horizontalness" of college administration nowhere exceeded except perhaps among organizations of physicians. Much that serves as general theory of public administration, derived from experience in hierarchies, had little validity here. All members of the above symposium (17, 21, 22, 34, 58) were aware that, with the rapidly increasing professionalization of governmental and business staffs, the characteristics of university administration which have been thought unique may soon permeate other types of organizations.

Institutional Organization and Administration

The institutional governing board was studied by Rauh (61), who emphasized its place and function in the organization and operation of privately controlled institutions, and embodied his conclusions in a manual for trustees.

Experienced executives commented on the office of the presidency. Stoke (68) declared: "Clear and firm decision, like good surgery, creates the antiseptic conditions for healing; nor are the strains and consequences of decision usually as unpleasant in fact as in anticipation." Woodburne (73), was convinced that "probably the most frequent mistake in top-level administration is holding deans or business officers responsible for decisions without giving them the authority to carry them out." Wriston (74) bubbled with pithy aphorisms such as: "Every time a formula is substituted for responsible judgment there is official defeasance." "Rules make decision easy but rob it of wisdom." "Every college president should rid himself of the deceptive cliché that research and teaching do not go together." All agreed a college is not a belt-conveyor manufacturing plant; not merely a hierarchy for the transmission of orders; not properly a site for a perpetual cold war between faculty and administration.

The role of the dean as faculty personnel officer, to deal with recruiting, appointments, inservice development, morale, and related responsibilities, was examined by Henderson (33) who also touched on how the character of the office has changed and developed during a quarter of a century. Eells and Hollis prepared an annotated bibliography of the administration of higher education (24). Investigating faculty personnel policies by visits to 11 state universities, Newburn (57) reported substantial data and made perceptive observations on many interviews.

Much thought and discussion about organization and operation of private liberal-arts colleges was stimulated by Ruml's widely circulated and controversial study (64), whose thesis was that institutional efficiency could be increased and faculty salaries substantially raised by reduction of the number of courses, larger classes, and a lower faculty-student ratio. Ruml insisted that these measures could be accomplished promptly and satisfactorily only if governing boards acted independently of faculty—a

reversal of the traditional role of the governing board as an "inspecting and consenting" body, and highly debatable.

The legality of the basic status and role, in all types of colleges and universities, of the governing board, the chief executive officer, administrators, faculty members, and students were studied by Chambers (14), who contended that wider comprehension of the simplicity and universality of the elementary legal principles would obviate many conflicts.

The Two-Year Community Junior College

Pursuant to the concept of the junior college as a means of providing less costly and more suitably diversified opportunities than are generally available to high-school graduates, Medsker (49) studied junior colleges nationally, concentrating on 15 states which contain two-thirds of all the public junior colleges and three-fourths of the total junior-college freshman and sophomore enrollments. He concluded that the local public junior college is, and probably will continue to be, the dominant form, as against the *state* junior college or the *branch* institution controlled by a state university or college. The last-named type appeared generally to exhibit (a) a narrower range of curriculum, (b) less freedom to experiment and adapt to local needs, (c) less financial stability, and (d) higher tuition fees.

Clark's analysis (15) of the first four years of the San José Junior College is a full-scale sociological and administrative case study which takes account of the "administrative web" in which the institution is set; its adaptation to its task; and its problems of organization, character, and role. One of the functions treated is the "cooling-out process" for the "latent terminal" students, that is, those who enroll in college-parallel courses but never proceed to further college or university studies.

Henninger's study (38) of the technical institutes goes into such problems as definition of function, justification of technical institutes, accreditation, and transferability of credits. He concluded that the two-year preparation of technicians cannot be equivalent to the first two years of an engineering college, but observed a practice among engineering colleges of admitting technical-institute graduates with such advanced credit as their proficiency warrants—the amount thus varying widely in individual cases. He noted that it is unwise to designate "terminal" curriculums, but better to call them "occupational," which actually is the more appropriate term.

Fields (25) summarized characteristics of the community college as (a) comprehensiveness, (b) accessibility, (c) reciprocity of relation to the community, (d) adaptability, and (e) service to persons of varying ages, intellectual abilities, and aims. Thornton (69) depicted this relatively new institution as an integral and indispensable part of our educational system.

The National Society for the Study of Education 1956 Yearbook (56), organized by Johnson and others in four sections, dealt with the sociological

foundations, the principal functions, the operating programs, and the planning for expansion of the nationwide network of public junior colleges. Among the merits of this report is a 12-page annotated bibliography.

The Economics of Higher Education

The changing composition of our population and the long-range trends in its occupational distribution, which, with the advance of technology, make increasing demands for trained talents, were dealt with in the Rockefeller report on education (63). Larger investment in higher education, thorough and continuous overhauling of state revenue systems, and expansion of federal support were seen as necessities.

Keezer, introducing a symposium (44), observed agreement among scholars of the finances of higher education about the apparently inevitable doubling of enrollments within a decade and the inescapable necessity of more than doubling operating funds within the same period. He also noted that from 1940 to 1954 the "real income before taxes" of faculty members declined about 5 percent, that of lawyers rose 10 percent, that of industrial workers rose 48 percent, and that of physicians rose 80 percent.

Coombs (20) showed, however, that faculty salaries rose 20 percent during the four years immediately after 1954, and another 7.5 percent in the single year 1958-59; he predicted that by 1965 they would be at twice their 1955 level. This would not solve the problem of staffing colleges, which would find themselves increasingly unable to fill their ranks with first-class teachers. This latter point has been supported by comprehensive data reported in the latest of the excellent annual studies (54) published by the Research Division of the National Education Association. A perspective looking further into the past was afforded by Ruml and Tickton (65).

The rising contribution by students in the form of tuition fees was documented by Conrad and Hollis (19), who found from a large sample that fees increased by 85 percent between 1940 and 1955. Hollis and others (40) showed that all student expenses (for board, lodging, travel, books, clothing, laundry, entertainment, and incidentals) were on a rapidly rising scale.

Harris (31, 32), speculating on the cost of higher education during the next decade, expected only modest additional contributions from philanthropy and governments, advocated increase of student fees, and proposed that families plan to pay for higher education as a commodity by the use of savings, life-insurance policies, and long-term borrowing. Different, and in some respects almost diametrically opposed, conclusions were reached by Millett (51), Chambers (13), and others, including the joint executive committees of the American Association of Land-Grant Colleges and State Universities and the State Universities Association. These latter, in general, believed it in the public interest to provide higher education in

publicly controlled institutions tuition-free or at nominal fees; that society, more than the individual, is the beneficiary; that adherence to this policy in the past has underlain our technological progress and material prosperity; and that demands of the future require its continuance. They contended that states and their subdivisions, by means of modernized revenue systems, can provide a large part of the required additional funds, though the ability of the states varies widely, but they concluded at the same time that assumption by the federal government of a larger share of the financing of higher education is inevitable.

Wide differences among the states as to "effort" to support higher education, as derived from the relation between per capita personal income and per capita expenditure for higher education, were documented by Hungate (42). Many states ranking high in "effort" were among the less developed states of the West or Southeast, whereas some ranking lowest were highly industrialized states with high per capita incomes.

The findings of Calkins (10) were intermediate between those of Harris (32) and Millett (51), but closer to the latter. Calkins stressed the importance of a reasonable autonomy for private and public colleges and universities, apparently concurring fully with the recommendations of the Committee on Government and Higher Education (18). Furnas and Ewell (27) provided a competent summary of the problems and unresolved questions related to expanded university research activities sponsored by federal agencies, and saw these enterprises, if continued and enlarged under contracts assuring an equitable recovery of all indirect costs to the universities, as a means of enhancing the size and quality of participating institutions. Kidd (46), studying the impact of federal sponsorship of research on universities, concluded that the quality of graduate training during the first years of large-scale federal support has not been impaired, as some had feared: "The gifted graduate student, as well as the group as a whole, is better trained." Recognizing many unsolved problems, such as that of exerting contervailing forces against the pressure to expand the physical sciences out of proportion to the social sciences, humanities, and arts, Kidd pointed to the crucial factor as "the national will to give first place to education at all levels, and to the fostering of excellence in all fields."

Henderson (35), who provided a comprehensive treatment of the issues facing higher education, observed that the over-all concept has been enlarged to include the development of the human resources of society and contended that the interest of the nation requires diversion of a larger share of the national income to higher education.

Finance and Fiscal Management

Ray (62), studying conflict in higher education, believed definition of educational requirements by competent professionals followed by finding

necessary resources preferable to cutting needs to fit a resource limit. He advocated effort to reduce conflict between governing boards and faculties, conflict between public and private higher education (though recognizing that it will not easily be entirely suppressed), and intrastate dissensions among public institutions. His conclusion that the basic conflict is between expenditures for higher education and expenditures for other things is one which all supporters of higher education can subscribe to. He noted the role of the various regional interstate organizations for co-operation in higher education, such as the Southern Regional Education Board, as well as other instances of voluntary co-operation.

Studying the possibilities of improved fiscal management in higher education, Heneman (37) stressed sound organization from the viewpoint of a widely experienced management consultant. Tickton (71) described and demonstrated the long-term budget as a management tool, pointing out its merits specifically for the small, independent college. Millett (50) analyzed the task of management in its university setting.

An enlightening analysis of the income and expenditures of a reasonably homogeneous group of 60 colleges, most of which were small and privately controlled, was provided by the National Federation of College and University Business Officers Associations (55). Surveying private support of higher education, Turner (72) found the annual total of somewhat less than $1 billion to be coming in roughly equal portions from six principal sources: (a) alumni annual giving, (b) business corporations and corporate foundations, (c) general-welfare foundations, (d) individuals other than alumni, (e) churches and religious orders, and (f) bequests, trusts, annuities, and miscellaneous sources. He estimated that one-ninth of this income went to tax-based institutions, among which were 10 state universities each receiving more than $3 million. A thorough treatment of the origins, policies, and roles of the great philanthropic foundations was provided by Andrews (2).

Clark (16) summarized the diffuse financing of educational, training, and research programs being carried on to an increasing extent by (a) industry, (b) the armed services, (c) fraternal, social, religious, labor, and other organizations, and (d) ad hoc (usually proprietary) schools and institutes, including correspondence schools, catering to individual clients. Thorp (70) firmly adhered to multiple-source financing, both as being most productive fiscally, and also because it strengthens academic freedom. He concluded that "the enhancement of our human capabilities by more and more investment in education will contribute to further technological, economic, and social development."

Reference Works

Successive editions of the two quadrennial reference books on higher education in the United States were published by the American Council

on Education in 1956 and 1960; the more recent editions are listed in the bibliography (43, 29). The American Council on Education became U. S. sales agent for the standard yearbook of British Commonwealth universities (26) and for the first edition of the handbook of the International Association of Universities (45), which describes 450 institutions in 70 countries other than the United States and the British Commonwealth. The annual report of the National Conference on Higher Education (3) appeared. Among numerous serial publications of the U. S. Office of Education were the annual list of degrees conferred (28), the statistics of land-grant colleges (39), the statistics of higher education as a whole (4), and the annual circulars of planning and management data (7). The well-known *Year Book of Education* for 1959 was devoted entirely to higher education (5).

Summary and Forecast

Among perceptible trends in early 1960 was increasing recognition of an appropriate degree of institutional freedom for state institutions. It was evidenced by increased disrepute in which unduly numerous, detailed, and rigid fiscal controls from the statehouse were held, and by recent statutes investing co-ordinating boards with only permissive functions. For example, 1960's California Coordinating Council for Higher Education has only an *advisory* function, in contrast to the drastic coercive powers of earlier prototypes such as the Oklahoma Regents for Higher Education, established by constitutional amendment in 1941. The notable studies by Moos and Rourke (52) and by Glenny (30) opened a neglected field in which investigation needs to be carried on continually. As higher education increases in complexity, study of its legal and fiscal aspects, such as that of Chambers (14), becomes more essential.

Interest in human resources, prominent in the work of Henderson (35), for example, and in the financing of higher education on a nationwide scale and a long-term basis (a decade or more ahead), as exemplified in Keezer (44), are significant. There is need for continued investigation of the relation between optimum provision of educational opportunity and the fee policies of public institutions, including those of public junior colleges. The National Defense Education Act of 1958 is a step in a new direction, and shows that the theory of "national interest" in higher education, advocated by Stoke (68) and others, is being recognized. It should be further explored.

Continuation of formal education designed for college and university administrators at the doctoral and postdoctoral levels and more commentary on the theory and practice of higher educational administration augur well. Research in all aspects of higher education is yet meager in relation to the size of the enterprise, which currently involves over $4 billion in annual operating expenses, a figure destined to rise to $10 billion within a decade. Establishment of centers for the study of higher education, financed tem-

porarily in whole or in part by the Carnegie Corporation of New York, at Columbia University, the University of California at Berkeley, the University of Michigan, and Stanford University and establishment of the Institute for College and University Administrators at Harvard, may begin a period of sustained and productive investigation. Of similar import are the programs, at several universities, recently subsidized by the Kellogg Foundation, relating to junior-college administration. Other hopeful signs include: the increasing research productivity of the three agencies of regional co-operation under interstate compacts; the two newly organized voluntary associations of institutions (public and private, respectively) in the seven states of the Midwest; the efforts of the Fund for the Advancement of Education and of a number of institutions to determine how to use a faculty effectively as the number of students increases; and the vigorous growth, nationwide, of the practice of institutional research and self-studies.

The research record of state-wide higher educational agencies (consolidated governing boards, superimposed co-ordinating boards, voluntary associations for liaison) is not impressive, though an exception is California, where the voluntary Liaison Committee of 15 years' standing has a history of substantial accomplishment. It should be recognized that continuing well-planned research is the first and foremost function of any state-wide educational association or agency, statutory or voluntary.

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Index to Volume XXX, No. 4

Page citations though made to single pages often indicate the beginning of a chapter, section, or running discussion dealing with a topic.

Abilities, intellectual: achievement of, as a goal of college, 323
Ability, student: relation to effectiveness of teaching methods, 356; relation to effectiveness of television instruction, 355
Academic freedom: reactions of faculty to concept of, 314
Academic success: prediction by intellective factors, 300
Accreditation, college: history of, 373; studies of, 373
Accreditation, National Commission of: development of, 386
Accrediting agencies: activities of, 386; regional, policies and procedures of, 373
Achievement, educational: and socio-economic class, 291
Achievement, high-school: and college attendance, 289
Achievement tests: use of, in college prediction, 300
Administration and faculty relationships, college: study of, 374
Administrative theory: application to higher education, 387
Administrator and student: conflicts between, 315
Admission, college: studies of, 298
Admission, early, to college: studies of, 344
Admission, selective: national pattern of, 290; procedures for study of, 301
Advanced placement: studies of, 343
American Council on Education Psychological Examination: institutional mean scores on, 313
Anxiety: relation to effectiveness of methods of instruction, 356
Application, skill of: as an outcome of independent study, 354
Aptitude tests: use of, in college predictions, 300
Articulation: of educational programs, 342
Attention to television instruction: effect on achievement, 355
Attitudes: effect of college on students', 311; of college student bodies, 291; of college students, 291; relation of, to knowledge in college students, 326
Attitudes, changes in college: from freshman to senior, scale to measure, 328; of students, 326; resulting from group discussion, 351
Authoritarian-equalitarian groups: among college students, 292
Authoritarianism: college student, changes in, 315; effect of college upon, 325; relation of effectiveness of methods of instruction to, 357; scale to measure, 328
Autocratic teaching method: study of, 352

Biographical information: correlations with college grades, 303
Biographical inventory: use in college prediction, 305
Budget, long-term: as management tool in higher education, 393
Business education: studies of, 341, 376
Business students: characteristics of, 288

California Test of Personality: stability of scores on, 330
Capacity of colleges: estimates of, 374
Centers for study of higher education: establishment of, 393
Change, educational: problems of studying, 330
Character education: at the college level, 291
Cheating, students' essays on: and college atmosphere, 316
Chemistry: articulation of study in, 343; study of output of Ph.D.'s in, 379
Church membership: increase in, result of college, 364
Class size: studies of, 351, 352
Classroom behavior: relation to authoritarianism in student teachers, 326
Climate: college, study of, 312; high-school, and motivation to attend college, 315
College: outcomes of, 321
College academic success: effectiveness of intellective predictors, 300; effectiveness of nonintellective predictors, 302
College admission: studies of, 298
College Characteristics Index: use to measure environmental press, 313
College education: student perceptions of, 323
College environment: dimensions of, 317; studies of, 311
College evaluation: review and analysis of problems of, 372

College image: perception of, by students and parents, 315
College student body: homogeneity of attitudes, 327
College student subculture: studies of, 315
College students: background and characteristics, 285; entering, diversity among, 325; types of, 316
College teachers: preparation of, 339
College teaching: reasons for attraction to, 315
Colleges: analysis of income and expenditures of 60, 392; enrollment trends in, 287; interaction of institutional characteristics of, with student characteristics to affect achievement, 357; public versus private, 287; ratings of, 375
Colleges and universities: co-ordination of, 386; evaluations, research needs in, 380
Communication, two-way: effect of, on learning via television, 354
Community colleges: characteristics of, 389; studies of, 389; training of technicians in, 337
Competition: and student cheating, 316
Control, experimental: in evaluation of complex programs, 365
Co-operative studies in higher education: description of, 378
Co-ordination, state-wide: of higher-education institutions, 386
Cornell University: history of state-supported colleges adjacent, 386
Counseling programs in residence halls: evaluation of, 361
Counselors: most important personality traits of, 362
Criterion problems: in college prediction studies, 306
Curiosity: as an outcome of independent study, 354
Curriculum changes: accompanying expansion from two- to four-year college, 374
Curriculum problems in higher education: surveys of, 374

Dean, college: predicament of, as an administrator, 388; role of, as faculty personnel officer, 388
Degrees conferred: annual list of, 393
Demonstration of small objects: via television, 354
Dental students: characteristics of, 289
Difference scores: problem of using, in growth studies, 330
Differential prediction and admission at college level: studies of, 307
Disciplinary programs, student: nature of, 364; preventive and remedial, 365
Discussion: effect of its combination with television instruction, 355
Discussion, small-group: as used in Pyramid Plan for teaching, 352
Discussion methods: dimensions of, 352
Discussion versus lecture: studies of, 351
Doctoral degree: factors tending to prolong completion of, 340
Doctoral programs and requirements: completion of, 340
Doctoral students: production of, and directiveness of teaching, 353; undergraduate college origins of, 288
Dropouts, college: causes of, 322; rate of, in relation to various factors, 321

Early admission to college: studies of, 344
Ecology of colleges: studies of, 311
Economics: of higher education, 390
Edwards' *Personal Preference Schedule*: use in college prediction, 305
Employment, college student: effects of, on achievement, 363
Engineering: accrediting problems of, 373; curriculums and general education, 334; education, study of, 341, 376
English fundamentals: teaching by television, 323
Enrollment, college: accommodations by colleges of future increases in, 374; future projections of, 293; in non-baccalaureate occupational curriculums, 338; regional differences in, 286; sex differences in, 287; size of, 286; statistics of graduate, 341; study of desirability of increased, 377
Environment, college: studies of, 311
Ethnocentrism: effect of college upon, 292, 325
Evaluation, problems of: in studying colleges, 371
Evening-college students: performance in liberal-arts courses, 335
Expenses, student: rise of, 390

Faculty: real income of, 390; shortage of, at college level, 390
Faculty-administration relationships, college: study of, 374
Faculty morale: and excellence in higher education, 378
Faculty of professional schools: views regarding liberal education, 377
Faculty personnel policies: of 11 state universities, 388; study of, 374
Faculty subculture, college: studies of, 314
Federal departments' education programs: study of, 340
Federal support of research: questions related to, 391
Fellowships, graduate: national survey of, 341; information on, 363

Feminine identity: and lack of commitment to intellectual goals, 328
Finances, college: analysis of, in 60 institutions, 392; effect on accreditation, 373
Financial aid, college student: studies of, 363
Financing of higher education: controversy over, 390; effort of states in, 391; private support of, 392; studies of, 390
Fiscal controls, state level: and efficient institutional management, 386
Food-service facilities, college: studies of, 362
Foreign students: college programs of, 365; follow-up of college training of, 365
Foreign study: enrollment trends in, 289
Foundations, philanthropic: origins, policies, and roles of, 392
Fraternity, college: as an influential reference group, 312; effects of, 362

Gains, measurement of: in evaluation, 378
General education: acceptance of, by students, 375; achievement of objectives of, 335; bibliographies on, 336; effect on student interests, 329; important developments in, 374; in technical curriculums, 338; measuring outcomes of instruction in, 372; studies of, 334
Gifted student: and college attendance, 289
Gifted student, college level: and study habits, 325; studies of, 292
Goals of education: perception by students and faculty, 291
Governing boards of colleges and universities: study of, 388
Government: relationship to higher education, 385
Grading, co-operative: compared with competitive, 352
Graduate education: studies of, 339; studies of, as a natural resource, 340
Graduate schools: enrollment trends in, 288
Graduate students: distribution among subject-matter fields, 288
Graduate training: effect of federal support of, on quality, 391; seniors' plans for, 288
Graduates: nature of, determined by initial college selection, 372; proportion of, to initial college enrollees, 321
Growth: technical problems of studying, 330

Health services, college: studies of, 363
High-ability college students: studies of, 292
High-school grade record: methods for increasing its correlation with college grade record, 302; use of, in predicting college success, 301
Higher education: controversy over student financial support of, 390; general criticism of, 379; history of administrative aspect of, 386; reference works on, 392
History: of accreditation, 373; of administrative aspects of higher education, 386
Homogeneous grouping: relation to gain in achievement, of authoritarians in, 357
Housing, college: studies of, 361
Human resources: and financing of higher education, 393

Ideal students: faculty and student conceptions of, 315
Images of college: by students and parents, 315
Impulse control: types of college students', 327
Impulses, readiness to express: scale to measure, 328
Independent study: accomplished through project method of teaching, 353; results of use of, 353
Information: achievement of, as a goal of college, 323
Institutional atmosphere: studies of, 311
Institutional productivity: relation to *College Characteristics Index*, 314
Institutional research: bibliography of, in graduate and professional education, 340; findings from a program of, 378
Institutions: and relation to personal needs, 317; description of characteristics of, 316; educational, evaluations of, 371
Instruction: improvement of, 351
Instructors: differential effectiveness of, with various testing methods, 357
Integration: of general or liberal education, 335
Intellective predictors of college academic success: effectiveness of, 300
Intellectual abilities: achievement of, as a goal of college, 323
Intellectual ability: and college attendance, 289; of students, selectivity of colleges in, 290
Intelligence: relation to effectiveness of teaching methods, 356
Intelligence tests, group: use in college prediction, 300
Interests of college students: change in pattern during college, 329; modification by general education, 329; relation of change in, to likelihood of graduation, 321

Interview: as technique of accrediting agency, 374; teacher-student, effect of, on achievement, 357
Intramural sports program: based on student needs, 362
Inventory of Beliefs: institutional characteristics and score changes on, 312; relation to other college student characteristics, 325

Journalism education: study of, 341; study of ratio of professional to liberal-arts content, 376
Junior-college expansion to four-year: curriculum changes accompanying, 374; prevalence of, 374
Junior colleges: case study, 317; characteristics of, as branch of state university versus state junior college, 389; enrollment in, 286; public, yearbook on, 390; studies of, 389; studies of transfer students in, 342; training of technicians in, 337

Laboratory instruction: experimental method of, 353
Law education: studies of, 341
Law students: comparison with medical students, 313
Leadership in student activities: in relation to student-body size, 362
Legal problems: of health service, 363
Legal status and role: of different levels of college hierarchy, 389
Lecture versus discussion: studies of, 351
Liberal-arts colleges: enrollment in, 286; history of, 336; nondenominational, and authoritarianism, 316; private organization and operation of, 388
Liberal-arts curriculum: professional content in, 377
Liberal education: bibliographies on, 336; effects of, as personified by faculty's student nominees, 328; studies of, 334; studies of aims and methods of, 377
Library-science education: studies of, 341
Life Experience Inventory: use in college prediction, 305
Loans, student: importance of, 290; information on, 363
Longitudinal study: of college students, 292, 327, 329

Manifest Anxiety Scale: use in college prediction, 304
Married students: housing of, 361
Mathematics: continuity in curriculum of, 343; summer program in, 344
Medical education: sociology of, 313; studies of, 341
Medical school: general education as prerequisite, 335
Medical students: characteristics of, 288
Minnesota Multiphasic Personality Inventory: characteristics of college dropouts on, 322; comparison of college samples with freshmen on, 329; use in college prediction, 304
Minnesota Teacher Attitude Inventory: relation to classroom behavior in student teachers, 326
Minority groups: authoritarian attitudes of, 315
Morale, faculty: assessment of, 378
Motivation: relation to changes in IQ, 324
Multiple correlation: use of, in college prediction, 301

National Commission on Accreditation: development of, 386
Need for achievement: relation to preference for independent study, 356
Negro college students: success in Northern colleges, 302
Nondirective teaching: effects of, 352; relation to production of doctoral students, 353
Nonintellective predictors of college academic success: effectiveness of, 302
Nonintellectual characteristics of students: college selectivity in, 290
Normative data, institutional: need for, in evaluation, 372
Nursing education: balance of professional and general-education content in, 376; eradication of dichotomy between liberal and professional studies, 335; in junior and community colleges, 337

Objectives, institution's: use in its evaluation, 372
Occupational aspiration: relation to social status, 290
Orientation to college: programs for, 364
Overachievement: and study habits, 314; as a college career type, 313

Peer culture: as a factor in students' college experience, 316; effect on college students, 328
Perception of college: by students and parents, 315
Perceptions, student: as evaluative device for college student personnel services, 366
Persistence: of changes in students, 329
Personality: changes in, by college experiences, 303, 324
Personality characteristics of college student bodies: studies of, 292
Personality functioning: relation to college achievement, 327
Personnel policies, faculty: and excellence in higher education, 378

Personnel policies in higher education: surveys of, 374
Physically handicapped: special facilities for, in colleges, 364
Placement service, college: studies of, 363
Premedical education: effect of liberal-arts content in, 377
President, university: comments on job of, 388; prime responsibility of, 387
Proctors: effect of, on television instruction, 355
Profession: characteristics of faculty oriented toward, 314
Professional education: studies of, 339; surveys of, 341, 376; tendency to become liberal, 335
Professional schools: enrollment trends in, 288; increase in women's enrollment in, 287
Professions, accrediting agencies for: activities of, 386
Programs, educational: evaluation of, 371
Project method of teaching: results of, 353
Psychiatric approach: use on students and their problems, 293
Psychiatry students: characteristics of, 289
Psychological services, college: survey of research in, 364
Public administration education: studies of, 341
Pyramid Plan of teaching: study of, 352
Quality: dimensions of, in colleges, 371
Questionnaire: as technique of accrediting agency, 374
Range, restriction of: effect on prediction, 301
Reading clinics, college: studies of, 364
Reference group: influences on student, 315
Regents of the University of the State of New York: history of, 386
Relationships, learned through guided self-discovery: retention of, 354
Religion: in the college educative process, 363
Religious beliefs: persistence of, after college graduation, 329
Religious elements: in general education, 336
Religious-emphasis week: effects of, 364
Research: as major occupation of doctoral graduates, 339; federal support of, 341; fostering of, in small college, 380; unresolved questions related to federal sponsorship of, in university, 391
Research-assistantship support: national survey of, 341
Residence halls: construction of, 361; studies of counseling programs in, 361
Responsibility, acceptance of: in self-directed class, 352; relation to achievement, 356
Retention of factual material: learned through independent study, 353
Rigidity: and value of independent study, 356
Role expectations: relation to institutional goals, 317
Rorschach: use in college prediction, 304
Rural-urban residence: and student aspirations, 290
Scholarly productivity of colleges: and personality characteristics of students, 292; relation of index of, to attraction of gifted applicants, 313
Scholarship winners: personality characteristics of, 292
Scholarships: importance of, 290; information on, 363
Scholastic aptitude: and college attendance, 289
Science courses: articulation among, 343
Selection of college applicants: studies of, 298
Self-directed class: comparison with conventional, 352
Self-studies, college: as part of accreditation process, 374; of specific universities, 340; findings on, 377
Semiprofessional education: studies of, 336
Senior class, college: synthesizing courses in, 335
Sex differences: in college enrollment, 287
Sex role: relation to academic orientation of female college students, 328
Size of college: effect on accreditation, 373
Skilled worker: training of, 336
Social roles: of college faculty, 314
Social support, need of: and value of independent study, 356
Social work, education: studies of, 341
Socialization: as principal effect of college education, 326
Socioeconomic class: and college attendance, 290; of college teachers, 315
Sociology: of medical education, 313
Sororities, college: effects of, 362
Specialization, change in field of: and likelihood of graduation, 321
Stability: of changes in students, 329
State-supported colleges and universities: co-ordination of, 386; fiscal control of, 385; history of colleges adjacent to Cornell University, 386
State-wide surveys: of higher education, 374, 386
Student characteristics: relation to effective teaching, 356

Student college personnel services: evaluation of, 366
Student culture: effect on college student, 328
Student employment, college: studies of, 363
Student mortality and survival: studies of, 321
Student personnel services: evaluation of, 365
Student problem areas in college: priority list of, 362
Student subculture, college: studies of, 315
Student union: educational role of, 362
Study activity: as a predictor of college success, 305
Study-skills courses, college: study of, 364
Summer-school programs: studies of, 344
Surveys, state-wide: of higher education, 374, 386

Teacher preparation: general-education aspects of, 335
Teachers: differential effectiveness of, with various instructional methods, 357
Teachers, permissive: characteristics of, 314
Teachers, student: relation of classroom behavior to authoritarianism, 326
Teachers, training of: for general-education instruction, 336
Teachers colleges: enrollment in, 286
Teaching: improvement of, 335; study of quality of, 377
Teaching-assistantships: national survey of, 341
Teaching machine: studies of, 355
Teamwork class: comparison with lecture, 352
Technical education: problems of, 338; studies of, 336
Technical institutes: study of, 389; training of technicians in, 337
Technical schools: enrollment in, 286; increase in women's enrollment in, 287
Terminal curriculums: preparation of, for nurses, 340; ratio of, to engineers need to increase, 336
Television, teaching by: results of, 321; studies of, 354
Terminal curriculums: nursing of, 389
Terminal programs: decrease in, with shift from two- to four-year college, 375
Terminal student: latent "cooling out process" for, 389
Testing: knowledge of results of: relation to learning, 365
Theological education: studies of, 341
Theological orientation: as integrating principle in general education, 335
Theological schools: increase in women's enrollment in, 287
Transfer students: studies of, 342
Tuition: rising contribution of, to college finance, 390
Tutorial group: study of, as teaching method, 352
Two-year college: studies of, 389

Underachievement: and study habits, 314; as a college career type, 313
Union, student: educational role of, 362
Universities: as social organisms, 387; enrollment in, 286; ratings of, 375; training of technicians in, 337

Values of college students: changes in, 291, 311, 326, 334
Viewing group, size of: as a variable in television instruction, 355

Women: post-college plans of, 363
Women's colleges: changes in students observed in, 329
Workbook drill: comparison with other instructional methods, 355
Writing, theme: teaching by television, 323

REVIEW OF EDUCATIONAL RESEARCH

Official Publication of the American Educational Research Association.
Contents are listed in the Education Index.

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Volume XXX, No. 5 **December 1960**

The Methodology of Educational Research

Reviews the literature for the three-year period since the issuance of Vol. XXVII, No. 5, December 1957.

TABLE OF CONTENTS

Chapter *Page*

Foreword 408

I. The Role of Research in Education—Present and Future . 409
NICHOLAS A. FATTU, *Indiana University, Bloomington, Indiana*

II. The Philosophy of Science in Educational Research . . 422
MICHAEL SCRIVEN, *Indiana University, Bloomington, Indiana*

III. Research Methods: Experimental Design and Analysis . 430
RAYMOND O. COLLIER, JR., *University of Minnesota, Minneapolis, Minnesota*
DONALD L. MEYER, *Syracuse University, Syracuse, New York*

IV. Research Tools: Statistical Methods 440
WILLIAM B. MICHAEL, *University of Southern California, Los Angeles, California*
STEVE HUNKA, *University of Illinois, Urbana, Illinois*

V. Research Tools: Access to the Literature of Education 487
MARGARET R. SHEVIAK, *Indiana University, Bloomington, Indiana*
HAYNES MCMULLEN, *Indiana University, Bloomington, Indiana*

VI. Research Tools: Observing and Recording Behavior 496
JOHN WITHALL, *University of Wisconsin, Madison, Wisconsin*

VII. Research Tools: Instrumentation in Educational Research 513
EDWARD B. FRY, *Loyola University, Los Angeles, California*

Chapter *Page*

VIII. Data Processing: Automation in Calculation 522

E. Wayne Martin, Jr., *Indiana University, Bloomington, Indiana*

Dale J. Hall, *Indiana University, Bloomington, Indiana*

Index 536

This issue of the REVIEW was prepared by the Committee on Methodology of Educational Research

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FOREWORD

This issue of the REVIEW, like corresponding preceding issues, presents a cross section of research methodologies used during the last triennium. The topic, sampling, is omitted because it is being covered by the report of the Second Annual Phi Delta Kappa Symposium, which is shortly to appear. Chapters in it by Leslie Kish and F. G. Cornell cover sampling from an elementary level to more complex ones. Discussion of instrumentation is added in this issue because educational research has reached a stage of development where pencil-paper data-collection techniques are no longer sufficient.

The importance of instruments in the physical sciences was indicated by Klopsteg (1960). Among the 138 Nobel laureates from 1901 to 1960, recognition was accorded to 112 for research in which instrumentation was a vital means. Both American Nobel prize winners in 1960 were recognized because of their contributions to instrumentation.

Some educational phenomena are inaccessible to direct observation, and others occur so rapidly or so frequently that a human observer is overwhelmed. As a result of recent advances in instrumentation, it is now feasible to record certain aspects of human behavior—particularly those related to stress and motivation—in a manner that is more objective than pencil-paper techniques. Interest in mechanical instructional and testing devices has been revived. For educational researchers such devices appear to be particularly helpful in providing a means of rigorous control in studies of instruction and learning. Virtually all applications of instrumentation in educational research have been in studies of instruction and learning by means of mechanical devices; the chapter devoted largely to teaching machines is especially apropos.

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CHAPTER I

The Role of Research in Education—Present and Future

NICHOLAS A. FATTU

THIS CHAPTER is devoted to consideration of materials relevant to educational research methodology, but not treated in the chapters as they are constituted. The discussion is framed broadly in terms of two questions: What is the role of research in education? and What is a desirable role for educational research in the future? The first describes some issues relative to educational research. The second discusses recent developments in the social sciences that have not been, but might profitably be, explored in educational research: model building, simulation techniques, systems analysis, mechanized learning and thinking models, information theory, and decision theory.

The Role of Research in Education

Studies of the role of research in education were concerned with discussions of professional status and professional responsibility: Brown (1960); Harris (1960); Flagle, Huggins, and Roy (1960); Goode (1958); Hunt (1956); Kidd (1959); and the first Phi Delta Kappa symposium (Banghart, 1960).

It was said that research provides the foundation of professional status. Brown (1960) summarized the requirement of a profession for practitioners (a) who are free and responsible individuals and who can be depended on because of their professional integrity to establish and maintain their professional standards of performance; (b) who keep a learning approach throughout life as a means of fulfilling their professional responsibilities through ready application of new knowledge.

Harris (1960) urged a "coming of age" in education. Technological schools, he contended, by abandoning the trades-training approach and instituting abstract theoretical approaches, now design engineering curriculums to make extensive use of intellectual formulations and research. According to Harris, technology, by coping intellectually with the problems it faced, won increasing respect and stature, but education appears to be still largely an application of psychological rules of thumb. Harris asserted that, to "grow up," education must conceptualize its processes and develop a series of new intellectual formulations. Improved conceptualization was also urged by the American Council on Education (ACE) (1939); the American Educational Research Association (AERA) (1956); Brim (1958); Brown (1960); Coladarci (1960); Goethals (1958); McConnell,

Scates, and Freeman (1942); Travers (1958); Traxler (1954); and Ulich (1937).

Flagle, Huggins, and Roy (1960) maintained that the professions have been forced to give research a larger role by the rapidly changing character of the world. For example, coal can be mined, iron can be smelted and refined, easily located petroleum can be exploited without scientific aid; but it is estimated that within a generation 75 percent of electrical energy must come from nuclear or solar sources. With unprecedented population increase, underdeveloped nations demand their full share of the world's goods. Inevitably all phases of civilization must become more complex and technical and demand greater scientific sophistication. Technology has become intellectual and strongly oriented toward research because the demands of the world have forced it to.

Not only have science and technology become more complex, but the rate at which changes occur has led to further problems. Johnson (1960b) estimated that knowledge of the physical sciences doubles every 15 years, and of the social and management sciences every 50 years. The latter increases at about the same rate as the population of the world. General Electric has indicated that over 40 percent of the products it currently sells were not in existence 10 years ago (Suits, 1958).

Brim (1958), Becker (1960), Hunt (1956), Kidd (1959), Traxler (1954) saw educational research as not keeping pace with the world. Becker (1960), finding an investment in American education of 24 billion dollars during 1960, observed serious deficiencies at all levels, and he believed that educational resources must be used more efficiently. His opinions were shared by Keezer (1960a) and by the National Bureau of Economic Research report on the economics of education. Economics of research and education was also explored by Keezer (1960a, b), Schultz (1959), Shockley (1957), and Siegel (1960). The point emphasized was that continuing expenditure on education presupposes a continual flow of good ideas. Simons (1960) saw the lack of such ideas as crucial and indicative of a necessity for greater emphasis on basic research.

The opinion that educational research has not kept pace with the world was widely expressed. Brim (1958) reported on deficiencies in educational research and proposed work to be performed by social scientists. Several professional organizations have expressed their concern in various ways. The Organization for Research in Education was established by the National Academy of Sciences and the National Research Council. (It was dissolved when the Council for Research in Education was established.) According to the first Phi Delta Kappa symposium (Banghart, 1960), more educational researchers are employed by foundations, industrial organizations, and agencies of the federal government than by public schools and universities.

Some notable activities were directed toward increasing educational research: the Council on Educational Research was established through the efforts of the late Percival M. Symonds and his associates at AERA.

The Phi Delta Kappa Annual Symposium on Educational Research and the Big Ten Research Directors Conferences were instituted. The Center for Advanced Study in the Behavioral Sciences has begun to consider educational researchers.

The most important boost for educational research was the establishment of the Cooperative Research Program of the U.S. Office of Education and the various titles within the National Defense Education Act. When the history of educational research is reviewed with the perspective of the future, these federal programs will probably stand out as the significant turning points in educational research.

Unfortunately these efforts are still too little and too late. A recent survey reported at the first Phi Delta Kappa symposium (Fattu, 1960) indicated that, of the 94 colleges and universities which grant the doctorate in education, only 10 could be said to be making a serious effort to encourage educational research by maintaining a favorable intellectual climate and giving adequate financial support, by making time and facilities available for faculty research, or by giving significant consideration to research when appointing new faculty members. It was suggested that the observed indifference to research might be related in part to the domination of these institutions by practitioners who attained their positions of influence through literary and forensic skills rather than through contributions to and understanding of science. In terms of allocation of resources—finances and faculty time—all of the 10 most highly respected institutions devoted more to research than to field services; among the rest the emphasis was reversed. Similar findings were reported by Phillips (1957) and Ryans (1957).

To summarize, more research is needed if education is to carry out its responsibilities in a rapidly changing world. More funds and other support are necessary to educational research.

Although American public education is more efficient than at any earlier time (it is probably the most efficient in the world), it is not as effective as it can and must be to maintain the American way of life. There are many competent, dedicated educational researchers, but their number does not meet the demand. Current trends in industry and government suggest that other agencies are prepared to assume responsibility for adding new knowledge. The implications of such an outcome for education as a profession should be a matter of concern to all educators.

The Nature of Educational Research

Educational research seemed to have fluid boundaries encompassing virtually all phases of scholarly activity associated with the educative process and organization. It included carefully designed experimental studies of current and proposed practices; mass collections of data, such as surveys, not illumined by systematic conceptual guiding lines, thought of

as routine work; theoretical, historical, philosophical, and integrative scholarly activities; critical reviews of research literature and summaries of issues and problems; applied research focused on local practices and policies, planned to stimulate interest in more fundamental studies, as well as to develop the school staff or solve an immediate problem.

The first Phi Delta Kappa symposium (Banghart, 1960) defined educational research variously as ranging from routine clerical operations to sophisticated disciplined inquiry. Descriptions of educational research included a variety of activities: listings and tabulation by titles (Blackwell, 1958; Brehaut, 1958); surveys of activities of researchers or organizations (Phillips, 1957; Ryans, 1957; H. K. Miller, 1958; MacArthur, 1958; Weitz, 1957); discussions of the nature of educational research (American Council on Education, 1939; AERA, 1956; Coladarci, 1960; McConnell, Scates, and Freeman, 1942; Levin, 1956; Travers, 1958; Traxler, 1954; Ulich, 1937; Walker, 1956); discussions of a framework for educational research (Goethals, 1958; Tiedeman and Cogan, 1958); discussions of activities of scientists (Schwab, 1960; Simons, 1960; Helmer and Rescher, 1959).

A consideration related to the definition of educational research is implied by the question, Is there a legitimate area for educational research? Discussion of the question appeared in several forms, but may be summarized as follows: Education is a practice and an art. The basic findings come from psychology, sociology, and other social sciences. Education takes these findings and applies them.

It is difficult to reconcile such a position with that observed among groups which currently make the most use of research—government, industry, and medicine. These fields recognize that discovery of new knowledge is only one step in the process toward effective utilization. For example, knowledge required to produce nuclear fission existed before the Manhattan project; it took a great deal of applied research and development to translate it into products and processes. In fact, the recent studies of the research and development process by the Carnegie Institute of Technology indicate that it is twice as costly (in time and resources) to produce the product or process as it was to make the original discovery.

A second relevant question is, What standards of research performance are self-imposed or enforced by the group? Again direct recent consideration is scarce. Lerner's (1959) and Weiss's (1960) comments more directly suggest that standards of expectation might be more explicitly defined and enforced. About a quarter of a century ago more direct attention seems to have been given to this matter (McConnell, Scates, and Freeman, 1942; ACE, 1939).

Desirable Amount of Research

No studies were discovered in the field of education that gave direct attention to the question of how much research is desirable. The National

Science Foundation awarded grants to the Carnegie Institute of Technology and the Western Reserve University to study this problem in the physical sciences.

Discussions of this topic found in business publications were relatively frequent, probably because survival in a rapidly changing competitive environment demands innovation. The rule of thumb was, Don't do any less than your nearest competitor.

Becker (1960) commented on the effects of underinvestment in education. Noting that public and private expenditures for education run to many, many billions of dollars each year, he pointed out that all types of education offer a fertile ground for comparative productivity and input-output studies.

The Distribution of Research Activity

Research activities are classified by the National Science Foundation as "basic research," "applied research," and "development."

Basic research includes original investigation for the advancement of scientific knowledge. The primary aim of the investigator is achievement of fuller knowledge or understanding of the subject matter under study, rather than making practical applications of new knowledge. Applied research is directed toward practical applications of scientific knowledge. Development is the systematic use of scientific knowledge for the production of useful materials, devices, systems, methods, or processes, exclusive of design and production engineering (Fattu, 1960). It is evident that the sequence from research to action is in that order. An invention of a device, procedure, or method cannot be made until the key, or last essential, fact is discovered: for example, a television set could not be produced until all the basic discoveries of electromagnetic radiation and synchronization of transmitted impulses had been made.

Tyler, in the Phi Delta Kappa symposium (Banghart, 1960), illustrated the utility of basic research using research in connection with hybrid corn as an example. Applied research on corn and cultivation practices had brought relatively small increments in yield; the development of hybrid corn, however, produced greatly increased yield. Here the breakthrough resulted from knowledge of plant genetics rather than from cultivation practices. The original discovery was made in 1908, but applications were not made until the 1930's when economic pressures forced the development. Also, hybrids must be developed or adapted to fit conditions of a region. Griliches (1957) summarized the story in detail and cited many related references. The example should be instructive to one who wishes to trace the interaction of basic research, applied research, and development.

Colleges and universities claim to add to as well as to disseminate knowledge; hence it would seem that basic research should find a congenial atmosphere within the university. The National Science Founda-

tion reported that, in engineering schools, 57 percent of total expenditures budgeted for research and development was devoted to basic research. In industry, funds for basic research totaled 344 million dollars, or about 4 percent of the 9.4 billion dollars spent for research and development. Corresponding data for educational research are not available and would be meaningless at the present time. Certainly, educational research requires more applied research and development than basic research, but the funds available for all educational research are so much less than those available in other areas that the task would seem to be first raising the amount, before considering the distribution.

Selection and Preparation of Educational Research Workers

Comments on training for research were presented by the American Psychological Association (APA) (1959), Brim (1958), Brown (1960), Cronbach (1957), Goode (1958), Harris (1960), Keezer (1960b), Kidd (1959), Travers (1958), and Walker (1957).

Selection of research workers was differentiated from that of practitioners. According to Cronbach (1957), Taylor (1956, 1958, 1959), and Thistlethwaite (1959), selection of researchers should emphasize creativity, as well as measures of aptitude, school performance, and motivation toward original inquiry.

It was suggested that a high grade in undergraduate work might be evidence of conformity that might be undesirable in research. Undergraduate performance in tasks requiring creativity, originality, and intellectual nonconformity were thought of as probably being better predictors. Motivation toward research was also considered a prime criterion for selection. Perseverance seemed a significant factor in scientific achievement. (In his autobiography, Max Planck stated that for 19 years the exploration of the Second Law of Thermodynamics occupied every waking moment that he could recall. Kepler and Galileo worked more than 30 years before they produced their formulations. Breakthroughs in science apparently require a high order of creativity and a concentrated effort sustained over a period of many years.) It seems reasonable to believe that the more complex the area of investigation, the more sustained effort is required.

There was agreement that the training of researchers should also differ from that of practitioners. It was suggested by several authors, including Helmer and Rescher (1959), that researchers need to understand the strategy and tactics of science and the language of science (including modern mathematics) and an academic scientific area. The preparation of research workers in the physical sciences appears to be more demanding than that for social scientists.

Agreement was almost unanimous that the best preparation for research is apprenticeship to a skilled researcher. The opportunity to participate in and carry on independent research and publication was regarded as

indispensable. The APA report (1959) summarized this point of view as follows: "Everything we have found points to the fact that course work, formal examination requirements, and anything else that could be standardized concerns what is ancillary to research training. What is of the essence is getting the student into a research environment and having him do research with the criticism, advice, and encouragement of others who suffer the same pain and enjoy the same rewards. . . . Research is learned by doing and taught mainly by contagion. Research must first be going on if there is to be research training. What formal courses are offered is no index of quality of a department as regards such training; the only adequate index is the eventual productivity of the individuals that the department produces."

The first topic discussed here has been some issues relative to educational research. No definitive answers were found, and at this time it would be premature to offer any. However, the well-being of education as a profession may lie in serious consideration of these and related topics.

Some Recent Developments in Educational Research

This section is a brief discussion of recent developments—operations research and systems analysis—that have been used profitably in a social science. Perhaps these methods can be explored, applied, and revised to help solve certain problems in education.

Operations research is the application of mathematical and other scientific procedures and common-sense procedures to the solution of problems encountered within an organization—specifically to co-ordinate the operations of the various functional units to attain the over-all objectives of the organization. Operations research may be defined as the application of scientific methods, techniques, and tools to problems involving operations of enterprises in order to provide optimal solutions.

Kershaw and McKean (1959) discussed the potential for operations research in relation to education in general terms. A comprehensive summary was made by Dorfman (1960). (In reading Dorfman, one should bear in mind that to master the mathematics is not to qualify as an operations researcher; one learns to plan and carry out operational experiments by experience.) A general view can be had from Johnson (1960a) in conjunction with Dorfman; then Flagle, Huggins, and Roy (1960) and Machol (1960). A student who wishes to study the matter thoroughly should consult the extensive bibliographies of the Case Institute of Technology Operations Research Group (1958) and Shubik (1960).

Some topics of operations research potentially useful for the study of educational problems are mathematical model building, mechanized models of the learning and thinking processes, and simulation procedures. A model is thought of as an analogue. It reproduces those features

of the thing modeled that are significant for the purpose at hand. In some cases, significant features are directly observable—as with maps, geological or topological representations, buildings, and the like. Models may incorporate features which show how the thing modeled responds to forces acting on it—models of ships, airplanes, electric generating systems, or atoms.

Orcutt (1960) saw a model as a physical representation, a prose description, an example of pictorial geometry, a mathematical statement, or a computer program presentation. Some concepts can be described and worked more easily in the language of one discipline than in that of another. In physical science, the optimal description appears to have been achieved in rigorous mathematical models. Mathematical models are preferred because of their precision in representing the pertinent data and because of the accuracy of their substantive interpretation. Mathematical models represent the basic structure of physical science. It was claimed that in the social sciences models have been brought to a stage where objective scientific method can be applied to them; both Cronbach (1957) and Thomson (1960) stated that mathematical formulation constitutes an aspect of science.

Machol (1960) stated that "it is possible to describe analytically any human function which can be reasonably defined in objective terms," and he included thinking insofar as the term is definable. Arrow, Karlin, and Suppes (1960) edited a symposium on mathematical models in economics, management science, and psychology. Bush and Estes (1959) presented similar models of various learning functions.

For those unfamiliar with the field, a suggested order of reading, starting with verbal description, follows: Lachman (1960) for general discussion of models in theory construction; Latil (1957) for cybernetics; Cyert, Feigenbaum, and March (1959) for a comprehensive review of management applications; Miller, Galanter, and Pribram (1960) for a discussion of "Totes." Mathematical background can be had from Cogan (1959) and Karlin (1959). Without the mathematics, these methods cannot be used. Perhaps a team approach might make problems more tractable for educational researchers.

Mechanized or programed models of learning and thinking processes were discussed at the verbal level by Friedberg (1958), Friedberg, Dunham, and North (1959), Gelernter and Rochester (1958), and Hovland (1960). Rosenblatt (1958) described the perceptron or automaton for perceiving and recognizing geometric shapes. Reiss (1960) discussed a model of neuromuscular organisms, the most frequently discussed type of programed model. The advantage of mechanized models is that they are more easily understood than mathematical models, but they retain the feature of requiring explicit and unambiguous analysis of the operation. Preparation of programed models points out gaps in knowledge and also provides incentive and means for filling the gaps. Machol (1960) believed that enterprising students might develop a programed model

of the instructional cycle for a variety of subject matters and educational goals. Development of such a model would clarify what is meant by such terms as "method," "goals," and "teaching."

One of the most interesting operations-research methods is simulation. Conway, Johnson, and Maxwell (1959), Orcutt (1960), and Shubik (1960) provide a good introduction to the study. Simulation is the operation of a model or simulator. The model is amenable to manipulations which would be impracticable or too expensive to perform on the entity represented; training jet aircraft pilots on Link Trainers is an example. The model can be studied, and, from it, properties of the behavior of an actual system inferred—an aircraft model in a wind tunnel or the hydraulic model of an economic system.

The most interesting simulations are those done by an electronic computer. The machine is told in general terms how a certain phenomenon takes place and is programed to run through the appropriate events many times under varying circumstances and to give a summary of what happened. How this is done can be seen in the instance of traffic-flow planning. The way traffic lights are controlled in a large city is often haphazard. The mathematical problems in optimizing the setting of lights are beyond present human capabilities. No matter. Let the traffic commission's plan be programed on a computing machine, and let several thousand programed "cars" loose through the "city," and see how long it takes them on the average to reach their destinations. Then try other programs, and make adjustments until the flow of traffic is improved.

The method is not basically different from present-day planning, which is also based on trial and error, but what would take years to observe, in actuality, takes hours in simulation. It is not surprising that simulation is most frequently used in gaming designed to give decision makers, in a matter of hours, years of experience in such matters as developing production schedules and buying and selling stocks. In educational research, the study of players and the opportunity to test hypotheses about the behavior of individuals and/or decision systems is possible.

This introduction has attempted to point up some issues related to educational research and to suggest methods that have proved useful in the social sciences. For educational research to advance from a verbal description of educational phenomena to more precise formulations will necessitate that researchers have a basic knowledge of modern mathematics and computers; mastery of these fields, as well as statistics, will probably have to be required for the advanced degrees that certify competence in educational research.

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CHAPTER II

The Philosophy of Science in Educational Research

MICHAEL SCRIVEN

THIS CHAPTER endeavors first to indicate where problems in educational research arising out of the philosophy of science are crucial. It also identifies those sources which provide a background in philosophy of science for workers in the "sensitive" areas. Particular attention is given to work of the last three years, inasmuch as this subject was discussed by Brodbeck in the REVIEW in 1957. Here, however, a somewhat different perspective on the topics discussed by Brodbeck is offered.

Areas of Relevance

Evaluation

A professional logician observing educational research of the last three years is at once struck by certain similarities which exist between it and other fields of contemporary research. An analogy between research in educational areas and research in psychotherapeutic areas holds with respect to the difficulty of constructing valid experimental designs. Both present a number of crucial variables, consequent difficulty of performing statistical analysis, and elusiveness of reliable measures for those variables. Both fields involve value judgments, even moral value judgments, in a number of experimental designs and in areas where experimental investigation is highly desirable.

The moral issues arise in connection with problems of manipulating the subjects appropriately in order to obtain valid experiments. More importantly, however, they arise with respect to the interpretation of the results as a basis for action within the profession itself. Examples are work on the "gifted" student, "adequate representation" of lower economic classes in the parentage of the high-school groups, the "appropriateness" of counseling and guidance procedures, the evaluation of colleges and high schools on a comparative or an absolute basis, the construction of effective disciplinary procedures, the introduction of automatic teaching machines, the "obligation" of the states or the federal government to finance or desegregate education, the separation of superior students into different sections and the associated acceleration procedures, and the interpretation of "creativity." These examples appeared on a survey of the REVIEW of the last few years. In all these cases, the authors of the chapters in question are consciously or unconsciously committed to moral value judgments, whichever interpretation they make of the relevant phrases.

One can, of course, give a purely operational, non-value-impregnated

definition of the term *superior college*, for example, perhaps by giving a simple index involving the proportion of its graduates who proceed to post-graduate work, who become highly thought of in their communities, or whose names appear in *Who's Who in America*. To do this is simply to postpone the uncovering of the assumption by one step. Such an index can be justified only by an analysis of the desirability of such achievements by the graduates. Those achievements must be assessed as being not merely the desired goals of the average college president, college faculty member, or college student, but also as being for the good of the community as a whole. Making such assessments means, essentially, making moral value judgments of these attainments.

Despite the obviousness of this point, much research continues which employs criteria that would not survive five minutes of critical explicit discussion. The explanation is simple. A strong tradition in the history of psychology separates empiricism from ethics, and the average researcher feels completely insecure when he discovers that his criteria involve ethical variables. Either he does not allow himself to perceive this fact, or, if he does perceive it, he says nothing about it.

He may, of course, turn his attention to variables which do not involve ethical components. In educational research this recourse rules out the most interesting problems of all, some of which have been mentioned. The philosopher of science has a role to play in helping the educational researcher with this dilemma, and in recent years extraordinary progress has been made toward development of a rational foundation for ethical judgment. Much of this work is yet unpublished, but some of it is referred to here (Baier, 1958; Brandt, 1959; Edel and Edel, 1959).

Thus it might be said that the defects in the utilitarian position, which have for so long encouraged research into nonrational ethics (the emotivist theory, for example), are now patched up, and it is possible to give a satisfactory, consistent, and non-question-begging utilitarian ethic. To disagree with the assertion just made is to disagree at a level and on grounds which provide little consolation for those who insist on the necessity for theological axioms in ethics. One of the most profound contributions which the philosophy of science has to make to educational research lies in the objectification of value judgments, especially social value judgments, that is, moral value judgments (on the utilitarian assumption).

Descriptive research in education is only part of the story. The most interesting results in the field, from the point of view of social action, concern causal analysis. When problems of causation in the social sciences are met with, difficulties of a kind quite unlike those in the physical sciences are encountered. Recent years have seen, in the philosophy of science, the development of an acute awareness of the important differences between the physical and the social sciences apart from that to which our attention has been called so frequently, namely, the involvement, in certain subareas of the social sciences, of value judgments.

Explanation

The most interesting work in connection with this discrimination between the physical and social sciences has occurred in the philosophy of history. In several recent articles, the most important of which were collected along with background readings in Gardiner's (1959) anthology, a group of philosophers of science elaborated the differences between physical and humanistic explanations. The ways in which this discussion of historical explanation can be transposed to the field of educational research have not yet been spelled out. Even to transpose them into the general area of scientific psychology is an important task still awaiting the attention of logicians.

Certain striking points, however, can be made. In the first place, the idea of explanation as deduction from true generalizations no longer holds (Dray, 1957). (This conclusion is not shared by the present reviewer's predecessor.) The abandonment of this view of scientific explanation is due partly to a realization that it is not attained by most physical explanations, and partly to a realization that the explanations, in history and elsewhere, of behavior of human beings are highly informative and, in a certain sense, fully complete, although these explanations are not deductions from true generalizations.

This sounds like a logician's squabble; but, to give one example of its significance for the social sciences, it follows from this and certain other considerations of a fairly acceptable kind, that the entire Hullian tradition of searching for mathematico-deductive theories of human behavior is a waste of time. (This is not to say that it was a waste of time when it was first done.) If the present reviewer reads the signs aright, there will inevitably be, in the ensuing decades, a concentration on local rather than global theories of behavior and an emphasis on work using our present conceptual terminology rather than on introduction of new jargons.

It is not irrelevant to a consideration of whether this is a fair prophecy to note in the last few years, within the field of psychology, an increasing acceptance of the criticisms of the Hullian and post-Hullian attempts at systematic theories of behavior put forward by Koch (1954) and others. Thus great importance must be attached to recognizing that the search for adequate causal analyses of human behavior does not lead inevitably, or even appropriately, to the development of axiomatic supertheories.

Causation

The belief of Russell (1953) and others that the use of causation in science is a sign of immaturity was widely accepted among traditional philosophers of science of the period 1925 to 1955. Where use of causation was found, it was considered a crutch with which the subject could limp on to better days. It now seems clear that the role of causal analysis,

although indeed minimal in such areas as theoretical physics in which exhaustive and effective mathematical laws are available, is indispensable both in the *application* of advanced sciences and, independently, in a *formulation* of the knowledge of the less theoretical sciences. Moreover, cogent reasons exist for supposing that there are certain sciences—among them large parts of the social sciences including parts of the educational field—where no expectation whatsoever of eventual development of abstract theories is appropriate. Hence, there is every reason to expect that large and respectable parts of science will continue to employ causal claims rather than precise systematized laws.

Naturally, this leads one's attention to a more careful analysis of the concept of cause. Fundamentally, a cause is a miniature explanation—not an *incomplete* explanation, but a small explanation. Particularly, it must not be taken to be the same as a sufficient condition, or a necessary condition, or as committing its employer to a belief in determinism. Cause is an identifying or selecting or focusing or differentiating notion, which operates somewhat as a premise in the analysis of deductive arguments. It can be understood only in the context of a particular inquiry, where the contrasts that it is used to educe can be understood; from a formal point of view, any one of 40 variables may be in the same position as far as a particular effect goes, but in the context of a particular inquiry one, and only one, of these may properly be called the cause. (It is thus a notion from pragmatics, rather than syntactics, to give it a proper place in the over-all field of logic.)

The empirical elements involved in isolating the candidates for a causal assertion still raise important problems of experimental design. How is a distinction to be made between a causal connection and a mere correlation? Brodbeck (1957), following Braithwaite (1953), proposed that the distinction lies in the answer to the question of whether the alleged connection can be deduced from some other law or laws: if it can, it is causal; if it cannot, it is a mere correlation. This is too simple, unfortunately. The problem still remains of whether the laws from which it is deduced are themselves causal laws or merely correlational laws. A complete answer requires a study of the role of the connection in those theories, usually of a very tentative kind, which could be said to provide an explanation of them.

Experimentally, the problem does not require the sophisticated analysis demanded by the philosopher. Nevertheless, it presents some intriguing difficulties. Suppose a certain treatment is applied to the experimental group, for example, intensive tutorial assistance, and that a perfectly matched control group ultimately shows itself to have attained equivalent improvement over a certain interval. This result is normally taken to demonstrate an absence of causal efficacy on the part of the experimental variable. It does not. It may well be that the experimental variable does produce significant improvement, but the described design (despite its Utopian assumption of perfectly matched controls) does not prove the

fact (Hook, 1959). This is a practical experimental result which arises from the logician's investigations. Similar practical consequences are found when applied medicine is turned to and the current status of the placebo studies is examined; it is not realized that a single control study cannot demonstrate any placebo effect.

Evidence

A great revolution in social science has been taking place, particularly throughout the last decade or two. Many educational researchers are inadequately trained either to recognize it or to implement it. It is the revolution in the concept of evidence. The problems that are faced in experimental design in the social sciences are quite unlike those of the physical sciences. Problems of experimental design have had to be solved in the actual conduct of social-science research; now their solutions have to be formalized more efficiently and taught more efficiently. Looking through issues of the REVIEW OF EDUCATIONAL RESEARCH, one is struck time and again by the complete failure of the authors to recognize the simplest points about scientific evidence in a statistical field. The fact that 85 percent of National Merit Scholars come from small families and that over 70 percent are first-born is quoted as if it means something, without figures for the over-all population proportion in small families and the over-all population proportion that is first-born.

The simple fact is this: by minimum acceptable research standards, 95 percent of the work in the field of psychotherapy that is concerned with causal analysis is, by either theoretical or practical standards, invalid or trivial. In educational research the situation is no different. So far as descriptive work goes, the situation is better; but this is less interesting (Hook, 1959). One cannot apply anything one learns from descriptive research to the construction of theories or to the improvement of education without having some causal data with which to implement it. There is no need for educational researchers to feel inferior because of this situation, but they should feel dissatisfied.

Corresponding to this persistent lack of sensitivity to minimum standards of good evidence in a multivariable field, there is the persistent failure to face up to the problems arising from the fact that the application of educational theories has morally significant consequences. In guidance and counseling, for example, which are no different in this respect from research into the education of the gifted or other fields that could be cited, two senior editors are found agreeing that "authors make many philosophical assumptions both explicit and implicit but usually neither examine nor test them" (Wilkins and Perlmutter, 1960).

From the logician's point of view, then, gross deficiencies of self-awareness in educational research exist, although techniques are available for handling most of these difficulties. As long as those in education allow their own institutions to put out written and cinematographic

propaganda which seeks support for higher education by arguing that the average income of graduates is so much higher than that of non-graduates as to more than reimburse them for the cost of higher education within very few years (without adducing any grounds whatsoever for supposing that this connection is in fact a causal connection and is not, for example, due to the higher income group of the families from which college students come)—so long will they fall short of achieving maturity for their own subject. This is an excellent example of an argument which is scientifically unsound and significantly immoral, since it encourages people to spend money on the basis of a belief which is not known to be well founded.

Sundry Issues

The confusion about what constitutes an adequate definition persists, and has continued to be discussed during the last three years (Feigl, Scriven, and Maxwell, 1958). As in the case of explanation, important advances seem imminent. It has been realized that the significant terms of theoretical physics are not amenable to explicit definition, or indeed to definition in any precise and condensed way. With this collapse of the idol around which most of the theology of operationism and reduction sentences was built, there has come a more realistic approach to definition. As Mandler and Kessen (1959), in a most encouraging book, have stressed, there is only one important standard for good definitions, and that is inter-user reliability in their use in a given verbal or empirical context. That is, the important procedure in the introduction of a new term is provision for adequate training in its use for the reader.

Typically, such training can be provided by giving many examples and some loose rules to serve as guidelines for the term's use. But the word *loose* here must not be misunderstood. A good definition, that is, a good explanation of the meaning of a term, gives extremely high reliability in its use. Whenever this can be done by explicit simple definitions, then it should; with the introduction of new terms this is usually possible. But it should not be dismaying to discover that some theoretical concepts, new and old, have acquired too great a burden of meaning for any explicit definition to encompass. In those cases it must not be supposed that the use of a single example (implicit definition) or a rough analogy will be adequate. If the introduction of the new term is to be justified, rather than the use of a concatenation of old ones, then it must be done properly, and this is a lengthy business.

To the logician it is clear that in educational research, as in the social sciences generally, there is still a pathetic tendency to identify the use of a jargon with the possession of a science. Terms such as *consonance* and *dissonance* in social psychology, *model, meaningful, intellective, normative, methods, scale, role, motivation, cross-cultural,* and *action research* are still used (in the special senses which are relevant to educational

research) in sloppy, unilluminating, and irresponsible ways. It could almost be said that, outside of statistics, terms which have been introduced specifically for educational research have done more to confuse than to clarify. That such a cynical generalization should have validity ought to make those concerned think three times before introducing new terms or new senses of old terms.

Another area where logical analysis is appropriate is discussion of objectivity, prejudice, bias, and similar concepts (Gardiner, 1959). There is still a pervasive tendency to suppose that the existence of a causal explanation for everybody's beliefs means that there is not a rationally superior justification for some of those beliefs. This is the old fallacy of the sociology of knowledge, and its ghost should have been long since laid (Hampshire, 1959; Hook, 1958).

Discussion of brainwashing, subliminal perception, and motivation research in advertising psychology and psychopathology has important consequences for the thoughtful student of education. What distinguishes brainwashing from education? What is indoctrination? What is propaganda? To what extent are educators in fact supporting this kind of influencing procedure in their school system with ritual observance of allegiance, emphasis on peer-group attitudes as a criterion for social action, and the like? Analytical thinking on this kind of subject is still badly needed (Kinkead, 1959).

Finally, careful investigation of the possibility and success of separate training in courses in logic, scientific method, critical thinking, and investigation of the extent to which such training transfers or generalizes to other fields is needed. Somehow it must be ensured that at a much earlier stage in their development, students become self-consciously aware of the process of education and its presuppositions and justifications, so that they will eventually be in a position to improve it in the many ways it stands in sore need of improvement.

General References

Many of the topics discussed here, and certain others of interest to the researcher (for example, logic of discovery), are discussed in compendious books that appeared during the last three-year period. Reference to these will give an interested worker a picture of the present range of relevant thought in the philosophy of science (Gibson, 1960; Hanson, 1958; Klibansky, 1958; Nagel, 1960; Popper, 1959).

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CHAPTER III

Research Methods: Experimental Design and Analysis

RAYMOND O. COLLIER, JR. and DONALD L. MEYER

FOLLOWING the pattern set by Stanley (1957), this chapter omits almost all the references which have been covered by Harman (1958), Grant (1959), and Kogan (1960). Writings which have relevance to or are potentially useful for educational experimentation from either a long-range or a short-range point of view are, in general, noticed. In certain areas of experimental design and analysis, only a representative number of the many papers which actually appeared have been considered.

Design and Analysis of Experiments

Most of the work relative to the design and analysis of experimental results during the last three years has added to and extended standard designs and analyses.

Randomized Blocks, Latin Squares, and Split-Plots

The frequently employed randomized-block design was considered by Sampford and Taylor (1959) for the experimental condition where it is known only that a particular subject's response is greater or less than some value. Treatment effects and bias were estimated, and modified *T*-tests were derived for testing treatment differences.

Mandel (1959) described a method valid for analysis of the Latin-square design under the presence of row-column interaction when the interaction can be represented by a simple multiplicative constant. Under certain experimental circumstances this technique might act to counter some of the behavioral scientists' past objections to the use of Latin-square designs. The modified Latin square was analyzed by means of randomization theory by Rojas and White (1957). For this rarely used design they obtained the expected mean squares under randomization and found the *F*-ratio for treatments to be biased, but with a relatively small magnitude.

The simple split-plot design was studied by Curnow (1957) as used both in a randomized block and in a Graeco-Latin square. For the special case of two split-plot units with possibly unequal error variances, he obtained a test of equality of, and confidence bands for estimating the ratio of, the two split-plot error variances.

A publication which has not received the attention it deserves is Wilk and Kempthorne's (1956) report on the derived-model and randomization theory. They provided randomization analysis of many standard

designs and included expected mean squares (needed in the specification of proper error terms) for various effects in many models under general schemes of sampling and randomization of treatment to experimental unit. Their summary of the role of randomization in experimentation should be of use and interest to many researchers who desire an intensive treatment of this problem.

Designs in Which Treatments Are Applied to Subjects in Sequence

An approach to repeated-measurements experiments, in which more than one treatment is applied to experimental subjects over a period of time, was given by Geisser (1959). His analysis took into account the presence of dependencies among observations on the same subject and provided estimation of treatment effects and a test of significance, a multivariate T^2-test, of treatment effects. Related problems were discussed by Freeman (1957), whose paper dealt with the specification of designs useful in situations where experimental units previously treated in an experiment are employed in a new experiment. He supplied analyses of variance and covariance and gave variances of treatment differences.

The involved task of constructing designs balanced for order effects in repeated-measurements experiments was examined by Bradley (1958). If an even number of treatments are being compared, it is possible to construct a Latin square in which each treatment is preceded by a different treatment in every row (and column if desired). These configurations have been found useful in counterbalancing immediate sequential or other order effects, and Bradley gave simple construction procedures for these designs.

Sampford (1957) offered methods for building and analyzing designs in which estimation and test of direct effects of treatment in the period applied, and also the residual effects on treatments in the following periods, were desired. For treatments applied in sequence to the same subjects, Sampford provided designs in which the residual effect of any treatment appears the same number of times either with each direct effect including itself or with each of the direct effects not including itself.

Factorial Experiments

The last few years have seen increased prevalence of experiments involving factorial arrangement of treatments. Experimenters include many factors, believing they are then studying a process similar to that which they meet in nature. This, of course, is a step away from the one-factor-at-a-time experiment. Many experiments involving several factors were reported, for this seems to be a very useful design in educational research.

A comprehensive listing of plans for full and fractional replication of investigations with up to 256 treatment combinations was provided by

Mitton and Morgan (1959). Dykstra (1959) considered two-level factorials and fractional factorials in which a subset of the treatment combinations was replicated in order to secure an unbiased estimate of error. Birnbaum (1959) provided methods for judging which of certain contrasts may be different from zero in factorial experiments performed without replication. Schwarz (1960) discussed a class of factorial designs for N observations which are distributed over the cells so that the cell frequencies are unequal but the resulting normal equations are explicitly solvable.

The problem of estimating effects, for example, linear and quadratic effects, in a single-factor experiment when the levels of the factor are unequally spaced was dealt with by Robson (1959), who presented a simple method of constructing orthogonal polynomials, with numerical examples. McHugh (1958) discussed Hartley's procedure for testing several effects in the analysis of variance for factorial experiments. This technique involves adjusting the significance levels for testing each effect so that an over-all error rate is not exceeded for all effects. The problems associated with the practice of using a single mean square in testing many effects are considered, and one solution is offered.

Designs Useful in Investigating the Nature and Maximum Values of a Pattern of Response

Of several articles dealing with response surface methodology, the most definitive was that by Box and Draper (1959). Considering the minimization of the integrated mean square error over some experimental region as a basis for the selection of response surface design, they showed that this criterion leads to two separate sets of terms: one involving the variance of the estimated response; the other, the specification bias. The optimum design which minimizes both variance and bias was found to be nearly the same as that given by minimizing bias alone.

Bose and Draper (1959) offered a special group transformation which leads to infinite classes of second-order rotatable designs in both two and three dimensions. Draper (1960) extended this transformation to second-order rotatable designs in four or more dimensions. Gardiner, Grandage, and Hader (1959) proposed several designs for exploring response surfaces when the assumed model is of third order.

DeBaun (1959) observed that the usual second-order designs require at least five levels of each factor and considered three-factor designs which require only three levels of each factor. None of these techniques and designs has been used to any extent in educational experimentation although there are areas such as learning research where their application might be efficient.

Nonlinear models were studied by Box and Lucas (1959). Their problem consisted of assuming a response to be a nonlinear function of either

parameters or variables, and then searching for a pattern of administering treatment combinations so as to allow a precise estimation of the parameters. Applying their approach to educational and psychological experimentation, for example, one might look for a schedule of time points so that observations taken at these points would permit efficient estimation of learning or growth parameters.

Miscellaneous Articles

A few articles not properly classified under the foregoing headings are reviewed in this section.

An important article by Chernoff (1959) contained a thorough, theoretical discussion of sequential experimentation. Since experimenters seldom perform experiments as single, isolated investigations, but rather as links in a chain of research and theory, there should be ready applications of sequential designs, and this particular paper is welcomed as a forerunner of applications to come.

Bechhofer (1960) developed a multiplicative model for factorial experiments where the variance of a variable is under study, giving analyses for testing hypotheses concerning variances. One can think of many educational and psychological investigations where the variance itself is an important variable. Designs which adjust for time trends or changes in a process over time and in which both qualitative and quantitative variables may be studied were presented by Hill (1960). The complexities associated with missing or mixed-up observations were discussed by Kramer and Glass (1960) for the Latin-square design and by Biggers (1959) for several designs.

Bradley and Schumann (1957) and Schumann and Bradley (1957, 1959) gave the underlying theory for comparing the sensitivities of two similar experiments, using noncentral variance ratios in both Model I and Model II of the analysis of variance, and discussed its application. The comparison of experiments with different scales of measurement was also discussed.

Inasmuch as most articles on incomplete block designs dealt with methods of constructing classes of partially balanced and balanced designs, they were considered to be of limited general interest and are not included here.

The Analysis of Variance

Scheffé's work on the analysis of variance has already been mentioned. A less extensive survey of analysis-of-variance models, their construction, and their differential aspects was that of Plackett (1960), who gave particular attention to the finite models of Kempthorne, Wilk, Tukey, and Cornfield.

Using matrix methods, Roy and Gnanadesikan (1959a, b) presented a unified general treatment for Model I and Model II in the analysis of variance both for the univariate and the multivariate case. Another comprehensive paper with a nontechnical approach to problems in the analysis of variance was Green and Tukey's (1960). Bankier (1960) proposed an operational method for obtaining the expected mean squares in the analysis of variance and the variances of estimates of variance components for an *r*-way classification.

The components-of-variance model was also considered by Bankier and Walpole (1957) for two-way crossed and nested classifications with proportional subclass frequencies. Useful expected values for various sums of squares were obtained for a variety of models. Likewise, Searle (1958) studied the two-way classification components-of-variance setup. For the unequal frequencies case, he derived the sampling variance of estimates of the components.

In some analysis-of-variance settings, the error components in the underlying model must be assumed to be correlated and to have unequal variances. This problem was treated by several writers, many of whom were motivated by repeated-measurement studies. Two such papers are informative.

Extending Box's original results on the two-way to the *r*-way classification, Bhat (1959) obtained distributions for various sums of squares under the assumption that the error components were correlated with heterogeneous variances. His results are of particular interest to researchers for whom the assumption of independent errors is untenable, for example, in the profile analysis problem and situations where the subject is measured under several conditions.

With different assumptions, Rao (1959) derived estimation and test procedures for various parameters in general linear models. He investigated models in which the observations are assumed to have the multivariate normal distribution with an arbitrary unknown variance and correlation structure estimable from the data. Rao's results, although difficult to apply, make it unnecessary to assume a patterned structure of correlations as is often done, and the repeated-measurement problem is thus given more generality.

With more emphasis on application, Matern (1957) offered a method for obtaining degrees of freedom through a linear combination of the number of squared terms in each component of the sum of squares.

With reference to tests of hypotheses in the analysis of variance, Sutcliffe (1958) concluded that random errors of measurement decrease the sensitivity of the *F*-test of difference among means. Again on tests of hypotheses, Collier (1959) showed that the test of a main effect, e.g., rows, for a two-way classification with interaction in a reparameterized model is equivalent to testing the hypothesis that the average of cell parameters for a row is constant for all rows.

Among investigations of the effects of assumptions in the analysis of

variance. Hack's (1958) paper was of considerable interest. He obtained empirical randomization distributions for row and column *F*-ratios in a completely randomized two-way layout with one observation per cell. Hack considered two configurations—one showing little deviation from normality and a second more markedly deviating from normality. He obtained 100 random permutations of the observations and compared the upper and lower 5-percent and 10-percent empirical *F*-points with those of Snedecor's *F*-distribution. Although agreement was close for the near-normal case, the theoretical *F*-points for the second case would be underestimates of the true permutation probabilities. Johnson (1958) followed with a theoretical discussion of Hack's investigation.

Srivastava (1959) studied the effects of non-normality on the non-null distribution of the *F*-statistic in an equal-frequency, one-way classification. Within the limitation of his specification of non-normality, he found that skewness had little effect on the power of the analysis-of-variance *F*-test, but that extreme deviations in Kurtosis affected the power function in a variable fashion, particularly with small samples.

The Analysis of Covariance

Under certain conditions, the analysis of covariance is a highly useful and effective tool in the interpretation of experimental results. The conditions under which it can be efficiently used were considered at length in the September 1957 *Biometrics*. Most of the papers included were reviewed by Grant (1959) and are not considered here. Unreviewed papers by Zelen (1957), Federer (1957), and Wilkinson (1957) were concerned with covariance in incomplete block designs, in unbalanced classifications, and as related to the incomplete-data problem.

Experimenters who have decried the practice of matching groups on one or more variables as a *substitute* for obtaining random-treatment groups will be buoyed by the results of Finney (1957). He concluded that: (a) the objective matching of groups is practically impossible, (b) the arrangement resulting from a matching procedure hardly qualifies as a random arrangement of units, and (c) the practice leads to a biased *F*-ratio. The use of a covariance analysis with matching techniques is able to effect little gain in precision.

Nonparametric Techniques in Experimental Design

Although many articles dealt with nonparametric techniques, we consider here only those directly relevant to experimental design.

A theoretical article by Walsh (1959) suggested a class of nonparametric procedures for testing the statistical identity of treatments in randomized blocks. Siegel and Tukey (1960) offered a nonparametric test for testing the null hypothesis that two samples come from the same

population against the alternative that the samples are from populations differing only in variability.

A rank-sum test for comparing each of several treatments against a control in an experiment was proposed by Steel (1959), who also later (1960) advanced a rank-sum test for comparing all pairs of treatments in a one-way classification with equal numbers of observations in each treatment. Van Elteren and Noether (1959) obtained the asymptotic efficiency of the test statistic underlying Durbin's rank analysis for the incomplete block design as compared to the analogous F-test in normal theory.

Using theory developed by Roy and Mitra, Hoyt, Krishnaiah, and Torrance (1959) gave the analysis for several hypotheses of interest in a four-way contingency table. Numerical examples were given and extensions to higher-order tables were indicated.

Some Current Thought in Experimental Design

Four basic works present the most incisive and progressive current views on experimental design and perhaps point the direction of future endeavors.

On the one hand, Gridgeman's (1959) re-examination of the problems surrounding Fisher's tea-testing lady will assure experimenters that the "old" controversies in interpreting experimental results have not been resolved. On the other hand, Kiefer, in two challenging papers (1958, 1959) departing from traditional views, compared the optimality properties of classes of designs, such as the Latin-square or balanced incomplete block designs chosen randomly or nonrandomly from these classes. For the designs considered, he concluded that—depending on the objectives of the experimenter, e.g., estimation or hypothesis testing—the symmetrical classical, randomized designs may be nonoptimal, and that nonclassical, nonsymmetrical designs may be optimal. The argument rests, of course, on definitions of optimality (Kiefer presents several), and there seems to be little agreement on this point among either statisticians or experimenters. The development of Kiefer's contributions should be of interest to many researchers.

A long-awaited presentation of a popular technique was offered by Scheffé's (1959) discussion of the theoretical and practical aspects of the analysis of variance, which gave extensive exposition of the various models and analyses used in the interpretation of experimental and survey results. He included finite and infinite models based on fixed, random, or mixed components and independent and dependent components. Scheffé's whole approach was one of rigorous exposition of a method of analysis which has had great utility.

These works reflect interest in examining the philosophy and structure of the design and analysis of experiments. As healthy as such interest is, it will cause the experimenter in time to alter his approach to experimentation.

Concluding Remarks

The foregoing discussion shows an abundance of articles and other writings on experimental design. Among books dealing with experimental design, the analysis of variance, and related topics were those of Chew (1958), Cox (1958), Finney (1960), Freund, Livermore, and Miller (1960), Haggard (1958), Li (1959), Maxwell (1958), Ray (1960), Scheffé (1959), and Williams (1959). Several of these books were reviewed in various journals, and references to reviews are given in the bibliography.

As is always the case, many articles could not be included. A list of the omitted articles may be obtained from the authors.

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CHAPTER IV

Research Tools: Statistical Methods

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THAT THE RATE of growth of statistical methodology is a positively accelerated phenomenon would seem to be true when one compares the amount of published material during the last three years to the quantity appearing during each of the several preceding three-year intervals. More than 1200 references were located, and about 450 have been included, whereas 216 references were noted in the corresponding chapter of the December 1957 REVIEW by Michael, Kaiser, and Clark.

Their pattern of organization and coverage is followed here. Statistical methods especially applicable to test construction, analysis, and evaluation are deferred for a future issue on educational and psychological testing. The period covered is essentially that between July 1957 and July 1960.

The chapter is organized as follows: after a review of recent books, attention is devoted to (a) general developments in statistical theory with particular stress on contributions to statistical inferences involving parametric procedures; (b) recent advances in the theory and application of chi-square and contingency tables; (c) published research concerning the binomial, Poisson, and multinomial distributions; (d) innovations and modifications in nonparametric theory and techniques; (e) developments in regression and correlation theory, including curve fitting; and (f) methodological advances in factor analysis.

The reader is urged to consult other chapters—especially the one on experimental design—to complete his coverage of other statistical areas such as analysis of variance and data-processing techniques. The excellent critiques of research in statistical methodology by Harman (1958), Grant (1959), and Kogan (1960) in the *Annual Review of Psychology* should not be overlooked.

Books

Scores of books on statistical methodology and experimental design appeared. Kendall and Buckland's (1957) new dictionary of statistical terms, prepared under the auspices of UNESCO, is an indispensable reference aid. For most researchers in education and psychology, books written by behavioral scientists will be the most helpful. Among noteworthy introductory texts are those by Blommers and Lindquist (1960), Diamond (1959), Downie and Heath (1959), Ferguson (1959), Johnson

*The writers are indebted to Cherry Ann Clark for bibliographic assistance in the early stages of preparation of the manuscript. The junior author is primarily responsible for the portion on factor analysis, and the senior author for the other sections.

and Jackson (1959), Mack (1960), Senders (1958), Snedecor (1960), and Walker and Lev (1958). Three lucid statistically oriented books in experimental design are Edwards's (1960) revised text and two new books, by Maxwell (1958) and Ray (1960). Not to be overlooked is a readily comprehended book in nonparametric and shortcut statistics by Tate and Clelland (1957).

At a somewhat more advanced level, but intended for the behavioral scientist, are two general books in quantitative methods: that by Lewis (1960) and a collection of papers from a 1959 Stanford University symposium edited by Arrow, Karlin, and Suppes (1959). At the same level of sophistication are books in multivariate and correlational analysis by DuBois (1957), Ezekiel and Fox (1959), and Haggard (1958).

At a high level of mathematical sophistication are: Kendall and Stuart's (1958) revision of their classical text in advanced statistical theory; a work on the testing of statistical hypotheses by Lehmann (1959b); two contributions to experimental design by Cochran and Cox (1957) and Cox (1958a); three books on multivariate and correlational analysis by Theodore Anderson (1958), Kendall (1957), and Roy (1957); and three philosophically flavored works on probability and inference by Feller (1957), Hogben (1957), and Jeffreys (1957).

Detailed consideration of the theory of measurement and scaling, as well as of individual and group decision processes and information theory, is beyond the scope of this chapter. Nevertheless, attention should be called to a number of significant contributions. In addition to Churchman and Ratoosh's (1959) provocative book concerned with the definition and theory of measurement, three outstanding volumes on scaling appeared: Torgerson's (1958) comprehensive treatment of method; the proceedings of the 1958 Princeton University conference on theory and applications of psychological scaling edited by Gulliksen and Messick (1960); and Thurstone's (1959) important collection of 27 papers on the measurement of values.

In the area of decision making, there appeared, beyond the relatively elementary presentation by Siegel and Fouraker (1960), four volumes: the papers from the 1959 Purdue University symposium on information and decision processes edited by Machol (1960), the presentation of Luce (1959) concerning individual choice behavior within the framework of psychophysics and utility theory, and contributions to decision theory and game theory by Chernoff and Moses (1959) and Luce and Raiffa (1957).

In information and communication theory the most elementary and readable volume was Attneave's (1959). More advanced books were produced by Kullback (1959), who described information theory within a statistical framework, and Middleton (1960), who wrote on statistical communication theory.

Particularly deserving of note is Kemeny, Snell, and Thompson's (1957) short, elementary book that introduces the reader who has studied only

high-school mathematics to the ideas of modern mathematics, including set theory, probability, vector and matrix algebra, and elementary game theory. Diligent reading of this little volume will give educational researchers a grasp of recent advances in statistical thinking. Other books that serve a similar purpose but require greater background in mathematics are, in order of difficulty, Finkbeiner's (1960), Hohn's (1958), Murdoch's (1957), Parker and Eaves's (1960), and Thrall and Tornheim's (1957).

Additional References: Alder and Roessler (1960); Ahmavaara (1957); Ahmavaara and Markkanen (1958); Bailey (1959); Bartlett (1955); Bharucha-Reid (1960); Burington and May (1959); Bush and Estes (1959); Davidson, Suppes, and Siegel (1957); Edwards (1958); L. I. Epstein (1958); Fraser (1958); Garrett (1958); Goldberg (1958); Goldfarb (1960); Grenander (1959); Gumbel (1958); Halmos (1960); Hendricks (1956); Hoel (1960); Hogg and Craig (1959); Johnson and Rao (1959); Levens (1959); McCarthy (1957); Moore (1958); Quenouille (1958); Resnikoff and Leiberman (1957); Riordan (1958); Scheffé (1959); Simon (1957); Sloan (1960); Steel and Torrie (1960); Stephan and McCarthy (1958); Von Mises and Geiringer (1957); Williams (1959a, b).

General Developments Primarily in Parametric Statistics

Emphasis on parametric theory and methods was greater than that given to nonparametric methods. It would appear that the pendulum may have swung in the direction of a continuation of the development and extension of statistical methodology along more traditional lines.

Statistical Inference in General

A number of specific papers in related disciplines concerned with statistical analysis and inference were of interest to the behavioral scientist. Two important contributions were made, for example, in the biological sciences: Chassan (1959) discussed the development of clinical statistical systems for psychiatry, and Emmens (1960) described the role of statistical analysis in physiological research.

General papers concerned with statistical inference were numerous. In an expository article based on Fisher's well-known tea-tasting problem, Gridgeman (1959) defended the rationale of a hypothesized population of identical experiments and argued that consideration should be given to non-null cases in theory testing if one is to construct a satisfactory probabilistic model for sensory-sorting tests and to realize efficiency in various experimental designs. Tukey's (1960) descriptive paper concerning paths along which experimental statistics should develop was directional in emphasis. As a participant in a symposium on scientific method, Taylor (1958) argued against use of statistical-significance tests to verify experi-

mental or research hypotheses that have not been logically evaluated, since absurd hypotheses may be supported. That errors of the first kind may be perpetuated in the psychological literature is evident from a survey by Sterling (1959) of 362 research studies appearing in four journals. In 294 of those studies, significance tests were used with the result that more than 97 percent of the null hypotheses were rejected in the absence of any reports of replication of previously published investigations.

In a historical discourse Welch (1958) reviewed Gosset's work and its impact on statistical thinking and concluded that Student's theory is an improvement in large-sample theory only if the populations sampled approximate Gaussian form. However, in a systematic study involving sampling from a normal, J-shaped, and rectangular distribution embodying the violation of the assumptions of equal variances, Boneau (1960) demonstrated, by and large, a minimal effect on the distribution of *t*'s results. Likewise, Srivastava (1958) showed that for practical purposes the power of the *t*-test is not markedly affected even when samples are selected from substantially non-normal populations. That interest in Student's theory has not diminished is also evident from an important extension of tables of percentage points of Student's *t* distribution by Federighi (1959), White's (1957) *t*-test for a serial correlation coefficient, Moore's (1957) two-sample *t*-test based on the range for pairs of samples between 2 and 20 size, a tabulation by Pachares (1959) of the upper-10-percent points of the Studentized range, and the study by Pillai and Tienzo (1959) of the distribution of the Studentized extreme deviate from the sample mean along with determination of percentage points.

Four other general papers on statistical inference were particularly noteworthy. Interested in ways in which current statistical theories can indicate the extent of uncertainty of an inference, Buehler (1959) developed some validity criteria and attempted to demonstrate the consequences of weakening classical assumptions concerning prior distributions. In his expository paper, Cox (1958c) considered problems of inferential decisions, the sample space of observations, interval estimation, significance tests, and the importance of assumptions. Particularly concerned with the amount of power that can be achieved in significance tests, Lehmann (1958) attempted, in his highly theoretical development, to show how significance levels could be chosen relative to alternative hypotheses of interest.

Good (1958), in a provocative paper, derided the notion that significance must always be precise. He discussed a number of controversial problems, and proposed a rule-of-thumb procedure involving use of a harmonic mean or weighted harmonic mean of the tail-area probabilities associated with various significance tests on the same evidence or data. Consideration was given to judgments about the weights to be employed for combining the results of several different types of tests of statistical significance that are applied to the same set of data (referred to as tests in parallel), in contrast to the more familiar independent tests of significance composed on different sets of data (described as tests in series).

Interval Estimation

Work on statistical estimation, especially interval estimation, was vast. In an expository and highly theoretical paper, Steinhaus (1957) considered in detail the problem of estimation. In an equally abstract paper, Wallace (1959b) described sufficient conditions in the realization of certain properties in a confidence procedure, and found that, if the confidence procedure at level α furnishes with respect to all samples the posterior probability α relative to some prior probability distribution with the parameter space, then there exist no subsets from the sample space for which "the conditional confidence is uniformly less (or greater) than α." Moreover, if a sequence of prior distributions should be employed, a result of wider application will result, although it is slightly weaker. Beale (1960) gave extensive consideration to confidence regions in non-linear estimation.

To distinguish between fiducial and confidence intervals, Stein (1959) selected an example in which—despite the apparent existence of a large fiducial probability—the chance of the true parameter's being contained within that interval is exceedingly slight. In the instance of significance tests, Anscombe (1957) was able to show that the sampling rule must be considered in order to apply correctly R. A. Fisher's fiducial argument. Supplementing discussion in his recent book (1956), Fisher (1959) compared his fiducial argument with that of Neyman and Pearson concerning confidence intervals, and proposed three requirements for making correct statements regarding mathematical probability. In a highly readable article, Chandler (1957) pointedly differentiated between the concepts of confidence and confidence level on the one hand and significance level on the other, the broad distinction being that of interval estimation and that of testing of hypotheses.

Among papers dealing with more specific problems pertaining to interval estimation were two by Dunn (1958, 1959a) in which she presented methods for constructing sets of simultaneous confidence intervals to include means of variables conforming to a multivariate normal distribution. For a (correlated or uncorrelated) bivariate normal population, Roy and Potthoff (1958) obtained confidence bounds on the vector analogues of the ratio of variances and the ratio of means. Other contributions were those of Tate and Klett (1959), who found optimal confidence intervals for the variance of a normal distribution; Ray (1957), who employed a modified sequential-estimation procedure for the determination of confidence intervals for the mean of a normal population when the variance is unknown; and Banerjee (1959), who developed expressions for the lower bound of confidence coefficients when samples are taken from a non-normal population.

The use of confidence intervals in conjunction with problems in sampling constituted an important feature of two papers. To handle situations in which a randomly selected sample may actually turn out to be undesirable

in a certain respect, Jones (1958) described a procedure that involves the calculation of confidence limits, although the disadvantage exists of having to specify in advance the subclass of inadmissible samples. In determining what the size of a sample should be relative to a designated width of a confidence interval that contains the parameter at a specified probability level, Graybill (1958) proposed a two-step sampling procedure.

Sampling Procedures

Although absent in statistical literature of the behavioral sciences, many articles on sampling appeared in journals on mathematical statistics. For the situation in stratified sampling in which 200 or fewer numbers are to be placed in 10 or fewer groups, W. D. Fisher (1958) devised a practical procedure based on the minimization of variance within groups that served to maximize homogeneity. Likewise, Dalenius and Hodges (1959) furnished means of minimizing variance in finite sampling.

In sampling from both finite and infinite populations, Aggarwal (1959) discussed Bayes and minimax procedures and considered the allocation of total samples with respect to familiar loss and risk functions. Sampling with replacement from finite populations was the subject of a paper by Raj and Khamis (1958), who extended their results to multistage designs. Basu (1958) discussed sampling procedures both with and without replacement, whereas Stevens (1958) limited his consideration to sampling without replacement. In the use of random numbers for the selection of a particular sample, Jones (1959) described ways for determining how many samples will be usable.

For the circumstance in which observations arise from noticeably different populations, Walsh (1959b) defined and described use of a generalized percentage point that not only guards against the acceptance of an erroneous assumption of the presence of a random sample, but also entails only slight penalty when a random sample actually occurs. Gupta and Sobel (1958) developed a sampling procedure for selection of a subset of observations by which all populations exceeding a certain standard are included at a specified probability level. Using a single-sample procedure, Dunnett (1960) described a minimax approach for determining how large a sample must be in order to associate it with the largest of the means of several normal populations of known equal variances and covariances.

Methods of double sampling as well as multistage or sequential sampling were considered in several papers with particular emphasis on development of, or modifications in, estimators. After examining the classical outcomes in theory of regression and estimation from double sampling and extending them to finite populations, Tikkiwal (1960) relaxed various assumptions and determined the resulting influences on the traditional minimum-variance linear unbiased estimators. By means of modifying familiar ratio-type estimators used in sample surveys involving a large

number of strata, Goodman and Hartley (1958) developed an unbiased ratio-type estimator with an exact formula for its variance and compared the precision of their approach to that of other estimators. Mickey (1959) also furnished unbiased ratio and regression estimators in the instance of random sampling without replacement from a finite population. For multistage samples Kish and Hess (1959) described complications arising from the variance of ratio estimators involving two variables. Nanjamma, Murthy, and Sethi (1959) discussed some sampling systems that provide for unbiased ratio estimators, and Murthy (1957) considered both ordered and unordered estimates in sampling without replacement.

Other noteworthy papers on sampling included those of DeGroot and Nadler (1958), who studied the behavior of Wald's sequential probability-ratio test when an erroneous value of variance was taken relative to two applications; of Wormleighton (1960), who furnished a helpful generalization of Stein's (1945) two-sample procedure; of Maurice (1957), who applied Wald's minimax procedure to develop a sequential method of sampling relative to making a decision between two normal populations from information given by two sample means; and of Hack (1958), who, in his empirical study of the distribution of *F*-ratios in samples chosen from non-normal populations, showed that considerable departure from normality may be tolerated.

Point Estimation

Aside from those concerned with sampling techniques, several other theoretically oriented articles appeared that were concerned with estimation. Bahadur (1957) considered unbiased estimates of uniformly minimum variance; Aitchison and Silvey (1958) took up maximum-likelihood estimation of parameters when they were subject to certain restraints; Roy and Chakravarti (1960) discussed ways of estimating the mean of a finite population; Tate (1959) studied unbiased estimation of functions of location and scale parameters for distributions of the exponential type; and Graybill and Deal (1959) showed how a set of random variables could be used to form a weighted combination of unbiased estimators that would in turn be a uniformly improved unbiased estimator.

Estimation in Censored Samples

For the singly censored sample in which measures above a cutting point in an ordered series are omitted or missing, Saw (1959) furnished unbiased estimates of the mean and variance of a normal population. Earlier, Saw (1958) derived moments of sample moments of censored samples selected from a normal population. In the instance of incomplete data associated with both censoring and truncation, Hartley (1958) presented a generalized method of maximum-likelihood estimation embodying simplified computational procedures. Making use of a single auxiliary function

that is conveniently tabulated, A. C. Cohen (1959) described simplified estimators of the mean and variance of a normal distribution from samples that are singly censored or truncated.

The problem of censoring was central to three papers involving use of order statistics (such as percentiles or linear combinations thereof) which are employed in estimation of parameters. Continuing earlier work previously cited in the REVIEW by Michael, Kaiser, and Clark (1957), Sarhan and Greenberg (1958) furnished tables in the instance of samples between 11 and 15 in size for the estimation of location and scale parameters through use of order statistics from both singly and doubly censored samples. Subsequently Sarhan and Greenberg (1959) furnished best linear estimates of location and scale parameters for the rectangular population under conditions of Type II censoring, and included graphs to illustrate the influence of censoring on relative efficiency of estimates. In a related paper Watterson (1959) extended methods of linear estimation to various sorts of censored samples taken from a multivariate normal population—methods which corresponded to those proposed by Sarhan and Greenberg for the univariate case. Finally, through use of order statistics, Dixon (1960) offered simplified methods of estimation from censored normal samples.

Estimation with Order Statistics Without Censoring

Dixon (1957) had earlier furnished several simplified estimates of the mean and standard deviation of a normal population, the efficiencies of which were compared to the sample mean and standard deviation and also to the best linear unbiased estimators. Other papers concerned with order statistics were those of Bose and Gupta (1959), who obtained moments of order statistics for samples from a normal population; of Harter (1959), who made use of "sample quasi-ranges" to estimate the standard deviation of a population; and of Masuyama (1957), who employed the sample range to estimate the standard deviation of the variable of any type of population.

Hypothesis Testing

Although there is a workable distinction between estimation and hypothesis testing in the consideration of problems of statistical inference, the fact that the concepts are not independent is well illustrated in a theoretical paper by Aitchison and Silvey (1960), who considered maximum-likelihood estimation procedures in conjunction with associated tests of statistical significance. In another highly abstract paper, Bulmer (1957) distinguished between the acceptability and the confirmation of a statistical hypothesis depending, respectively, upon whether the hypothesis is supported by a significance test, or comparable procedure, or is rejected. With confirma-

tion defined in terms of a distance function in the hypothesis space that indicates the extent of the discrepancy of any hypothesis from the null hypothesis, all admissible hypotheses can be tested and then classified as either acceptable or unacceptable. If in terms of distance none of the acceptable hypotheses close to the null hypothesis turns out to be "near" to the null hypothesis, it is declared to be confirmed; otherwise the experiment may be regarded as inconclusive, with the null hypothesis unconfirmed. Applications of the rationale are presented along with prior discussion of the acceptability of likelihood criteria. That the standard likelihood-ratio test of the general linear hypothesis possesses a broad class of optimum properties was shown by Lehmann (1959a) to result from the fact that it is uniformly the most powerful invariant.

Testing the hypothesis of homogeneity or hetereogeneity was the subject of several papers. In an important article concerning the testing of homogeneity of alternatives ordered in value, Bartholomew (1959a) stressed that the appropriate test of a hypothesis rests on the careful specification of alternative hypotheses. He proposed that in place of stating the more general hypothesis of inequality among alternative means, for example, one should, in the presence of available information, specify the rank order of the means—a circumstance for which he furnished a solution involving an appropriate one-tail test. Subsequently Bartholomew (1959b) extended his results to more significance levels and gave percentage points for as many as five ordered alternatives. In an empirical investigation of a simple test of the homogeneity for populations composed of normal distributions, Baker (1958) indicated that his test would detect nonhomogeneity when samples are as small as 50.

Related papers were those of Maurice (1958), who investigated the problem of ranking the means of two normal populations when the variances are unknown; Zinger and St-Pierre (1958), who furnished a means of selecting which mean is highest or lowest in three normal populations with known variances; Anscombe and Guttman (1960), who considered rules appropriate in the rejection of outlying values in experimental work when the population variance is known; and Haldane (1959), who analyzed hetereogeneity from the standpoint of estimating the mean and variance of a frequency when it varies throughout a series of samples.

Among other papers concerned with the testing of hypotheses, Gnanadesikan (1959) proposed a test of the hypothesis of equality of more than two variances in more than two univariate normal populations. He extended his results to the multivariate case in which the equality of more than two dispersion matrices is tested against certain alternatives. To determine the equality of variances of two normal populations, Ramachandran (1958b) developed and illustrated a completely unbiased two-sided test with the property of monotonicity and furnished appropriate significance tables. For use when the upper bound of the standard deviation is known for samples from a normal population with unknown means and unknown variances, Colton (1960) suggested a test procedure the power

of which under certain conditions exceeds that of the familiar *t*-test or *F*-test.

For the small-sample situation in which symmetric truncation of the normal distribution has occurred and in which a one-sided test of the hypothesis for the mean of the distribution is made, Aggarwal and Guttman (1959) showed that the loss in power decreases very quickly as a function both of the discrepancy between the alternative value of the mean and that hypothesized and of the distance of the hypothesized mean from the points of truncation. Assuming that the parameters of a population are known, Clark (1957) considered how one-tail and two-tail truncation of a normal population should be carried out relative to prescribed probabilities in order to meet specified requirements for values of sample means.

Other papers concerned with tests of hypotheses were those of Blyth (1958), who considered possible definitions of relative efficiencies when the same hypothesis is tested through use of two sequences of tests and who also calculated relative efficiencies of the Student test and sign test against normal alternatives; of Khatri (1960), who proposed two statistics for testing the hypothesis of equality of ranges in k rectangular populations and included a tabulation of five-percent points; of G. S. James (1959), who put forward a new "exact" test for weighted means that takes into account information furnished by the variances; of Schumann and Bradley (1957), who compared the sensitivities of similar experiments embodying different scales of measurement through tests of hypotheses on the noncentrality parameter involving two noncentral variance ratios; and of Dempster (1958, 1960), who developed a two-sample significance test as an alternative approach to Hotelling's T^2 statistic.

One-Tail Versus Two-Tail Tests

Though less prominent than during other three-year periods, interest in the one-tail versus two-tail controversy persisted. Challenging the three criteria proposed by Kimmel (1957) for determining when one-tail tests can be used, Grant (1959) believed that two of the criteria invited confusion and endangered "the integrity of the rejection level," and Goldfried (1959) somewhat discounted the importance of two of Kimmel's criteria for determining the theoretical predictability and psychological meaning when "unexpected" results occur with a one-tail test. He implied the need in this situation for flexibility in the experimenter's decision of whether or not to use one-tail tests depending on difficulties encountered. Shaklee (1957) disputed Kimmel's statement that there is a doubled probability of commission of a Type I error under a two-tail hypothesis for corresponding significance levels. More important was Kogan's (1960) point that the region of rejection need not be either equally distributed in each tail or concentrated in one tail of the sampling distribution; illustrated in terms of Ramachandran's (1958b) finding that in the customary application of the *F*-test for equality of two independent variances involving equal-tail

areas, the increase in the power of the test is not monotonic as the ratio of the variances of the two populations departs from equality. After pointing out a frequently committed logical error of making a directional statistical decision after the null hypothesis has been rejected in a nondirectional two-sided test, Kaiser (1960c) outlined what he believed to be an appropriate treatment based on Wald's statistical decision function.

Approximation Methods

In a general paper with important implications for and relevance to problems of estimation, Burkholder (1959) systematically and critically examined conditions that allow a best approximation to one distribution function by another distribution of a specified type. Somewhat more specifically, Wallace (1959a) considered formulas that would convert upper-tail values of Student's t distribution, as well as chi-square variates, to normal deviates. To allow for the situation in which a slow-moving trend in the mean of a population serves to introduce bias in customary measures of dispersion such as sample range, sample-mean deviation, and sample variance, Sathe and Kamat (1957) offered four new approximate measures of dispersion derived from successive differences. By means of extending the standardized percentage points of the Pearson Type-IV curve, Merrington and Pearson (1958) succeeded in effecting a close approximation to the distribution of noncentral t.

Useful Tables and Nomographs

Tabular preparations and graphical aids constituted an important part of many of the papers reviewed, and five articles were specifically concerned with such means of presentation. In order to avoid calculations involved in using existing rectangularly distributed observations, Quenouille (1959) made available tables of random observations derived from some standard distributions. The customary need for estimation of parameters in bio-assay problems, a part of the procedure referred to as *normit* analysis, led Berkson (1957) to develop tables for use in estimating the normal distribution function by methods of normit analysis. Subsequently Berkson (1960) provided nomographs in order to fit the logistic function by the method of maximum likelihood.

For the normally distributed random variable with unknown mean and known standard deviation, Barraclough and Page (1959) developed tables to assist in the calculation of Wald's sequential test for the mean of a normal distribution. Particularly helpful in rating techniques is Moonan's (1959) tabulation of the frequencies of the normal distribution relative to selected numbers of class intervals and various sample sizes.

Additional References: Cox (1957); Dwight (1957); B. Epstein (1960); Eisenberg and Gale (1959); Fisher and Cornish (1960); Gjeddebaek

(1959); Gupta (1960); Hogg (1960); Hoyt and Krishnaiah (1958); N. L. Johnson (1958); Katz and Powell (1957); Rider (1957, 1960a, b); Ruben (1960); Tukey (1957); Turner (1960).

Chi-Square, Contingency Tables, and Related Topics

Emphasis on the chi-square statistic and problems posed by use of contingency tables was less than during the previous three-year period.

Contingency Tables

Several noteworthy statistical contributions concerning the use of contingency tables appeared. Extending their well-known paper noticed in the December 1957 issue of the REVIEW, Goodman and Kruskal (1959) further considered in detail the use of measures of association for cross-classification and included a comprehensive bibliography of 150 references. Of particular help to the behavioral scientist is Mayo's (1959) definitive paper concerning ways in which the contingency table can be strengthened as a statistical method. Specifically, Mayo presented recommendations of how chi-square can be employed for small samples in the instance of both attributive and qualitative data, described various approaches to the determination of indices of relationship, discussed at length alternative hypotheses that could be proposed and empirically verified when a significant chi-square value is obtained, enumerated and commented on three approaches to the assessment of higher-order interaction, and finally suggested numerous computational procedures and graphic aids to assist the researcher. In a related paper, Hoyt, Krishnaiah, and Torrance (1959) proposed ways of analyzing complex contingency data.

Concerned with the equivocal results arising out of index of association in contingency tables, Blalock (1958) furnished conditional probabilistic interpretations of coefficients of mean-square contingency and suggested another coefficient as yielding unambiguous results. Making use of work in information theory, Kupperman (1959) proposed a simple coefficient that could be used to test the null hypothesis of independence between row and column classifications and gave a numerical illustration. In the instance of a two-by-two-by-two contingency table, which seems to have been neglected in educational research, Snedecor (1958), in reply to an inquiry, evaluated possible outcomes in the application of alternative chi-square techniques that have been proposed by a number of investigators. Also interested in higher-order contingency tables, Kastenbaum and Lamphiear (1959) succeeded in generalizing Bartlett's method to allow a test of the null hypothesis of the absence of any three-factor interaction in a three-way contingency table, although the computational efforts in estimation of the parameters are almost prohibitive.

Two practical problems in the area of consumer preferences and in the

area of accidents and absenteeism, respectively, prompted papers by R. L. Anderson (1959) and Nass (1959). For the situation in which each of n consumers is asked to rank each of three varieties in a one-two-three order of preference and to record the judgments in a contingency table, Anderson proposed a method of analysis that takes into account the lack of randomness in repeated samplings. Nass described a chi-square for handling small expectations where there is a large number of small samples of accidents or absences for one worker during two or more subperiods of a total period of observation. The test permits inferences of whether the absences or accidents of individual workers can be considered a random sample of the population furnished by marginal totals of the contingency table irrespective of whether these totals correspond to the actual lengths of subperiods or some other assumption concerning the distribution of absences or accidents.

Goodness-of-Fit Applications

Considerable attention was devoted to use of chi-square as an indicator of the degree of goodness-of-fit. After detailed consideration of the previous work of Chernoff and Lehmann, summarized in the December 1957 issue of this REVIEW, Watson (1957) made use of their findings in conjunction with the normal distribution, allowed the class intervals to contain, relative to the sample mean and variance, constant probabilities so as to vary with sampling, and concluded that the chi-square statistic (defined as $\Sigma(f_o-f_e)^2/f_e$, whereas chi-square stands for the well-known distribution or for a variable with this distribution) is distributed in the Chernoff and Lehmann form. Watson then proceeded to suggest that, in practice, at least 10 class intervals be employed in order that tabular points for the well-known chi-square distribution can be used with an error less than 1 percent. Moreover, discussion was directed to the asymptotic distribution found when fitting is to a normal distribution.

Extending his earlier work on chi-square goodness-of-fit tests to that of fitting an observed distribution to hypothetical continuous distributions, Watson (1958) gave detailed consideration to the number and size of class intervals that should be chosen, and he concluded, contrary to accepted practice, that many, rather than few, class intervals should be employed so that probabilities of inclusion in each interval are approximately equal —a procedure rarely followed by behavioral scientists. More recently Watson (1959) presented some results obtained in the application of chi-square goodness-of-fit tests.

Three other papers pertaining to goodness-of-fit tests were those of Darwin (1958), who employed the method of characteristic functions to effect a correction to the familiar approximations of the chi-square goodness-of-fit criteria for the multinomial distribution; of Chapman (1958), who made a comparative analysis and evaluation of many one-sided good-

ness-of-fit tests; and of Lancaster (1958), who, in addition to considering the relationship between contingency and correlation, proposed a new test for the goodness-of-fit of the bivariate normal distribution.

Miscellaneous Papers

Discussing the Studentized smallest chi-square, Ramachandran (1958a) proposed a method for ascertaining whether among a set of variances the smallest variance is significantly less than a designated variance. To investigate the possibility of the presence of a significant component of a certain type of departure from a hypothesized proportionality when the over-all chi-square reveals nonsignificant heterogeneity, Bodmer (1959) proposed an approximate test for the existence of an extreme frequency in a set of binomial frequencies.

Additional References: Mitra (1958); Sankaran (1959); Stanley (1957).

The Binomial, Poisson, and Multinomial Distributions

Approximately 30 papers concerned with the binomial, Poisson, and multinomial distributions are of interest. On the binomial distribution, the contribution of greatest practical value was that of MacKinnon (1959), who furnished a concise table containing 12 probability levels of the symmetric binomial cumulative distribution for samples ranging in size to 1000, and also included useful approximation methods. Bahadur (1960) considered several approximations to the distribution function of the binomial.

Problems of sampling and estimation were given much emphasis. In order to show the experimenter how large a difference and what confidence coefficient to choose for two binomial populations, Somerville (1957) described a procedure based on the minimax principle and furnished a formula for determining sample size as a function of cost of sampling and the cost of making an erroneous decision. For a family of binomial distributions, DeGroot (1959) developed criteria in order to achieve a workable sequential sampling procedure involving an optimal unbiased estimator of specified values for the parameter. Also concerned with sequential estimation of a binomial parameter, Armitage (1958) described a method to obtain confidence limits for a binomial probability and calculated unbiased estimates of the parameter relative to three sequential designs. Vagholkar and Wetherill (1960) proposed a binomial sequential probability-ratio test which they considered to be the "most economical."

Interval estimation for the parameter in the binomial model was the subject of a paper by Clunies-Ross (1958). In order to determine narrower confidence intervals than those given by classical procedures for the param-

eter of the binomial and Poisson distributions. Stevens (1957) examined several different methods. In the treatment of data embodying binomial responses for which the logistic curve is often used as an alternative to the integrated normal curve, Silverstone (1957) demonstrated that the method embodying maximum likelihood, but not the method of "minimum logit chi-square," furnishes sufficient estimators for the logistic curve and thus strongly recommended the former approach in preference to the latter.

To investigate a practical problem in the combining of accident frequencies, Tanner (1958) used a binomial model. Using a Poisson approximation to the binomial, Buehler (1957) developed, for small probabilities of failure and for samples of moderate size, an approximate method for estimating confidence intervals involving the product of two binomial parameters and furnished tables of intervals relative to the 90-percent and 95-percent confidence levels. For the situation in which an erroneous observation or report yields c defective samples when actually the number is $c + 1$, A. C. Cohen (1960d) employed the method of maximum likelihood to estimate the binomial parameter.

For N binomial samples of the same size, the relative frequencies of which have been ordered in value, Chassan (1960) developed an expression with respect to a significant level α for the upper bound of the probability that the particular observed ordering of values under the null hypothesis could arise by chance. In the comparison of several rates or proportions, such as relative frequency of lung cancer in smokers and nonsmokers, Sheps (1959) examined several models and suggested a general method of estimating parameters. For the difference between binomial probabilities, MacKay (1959) offered asymptotically efficient tests based on the sums of observations.

The estimation of parameters in a truncated, a conditional, and a modified Poisson distribution, respectively, was the subject of three papers by A. C. Cohen (1960a, b, c). Related studies were those of Sprott (1958), who applied the method of maximum likelihood in estimation procedures concerning the Poisson binomial distribution; of Irwin (1959), who considered the estimation of the mean of a Poisson distribution from a sample for which the zero class is absent; of Tate and Goen (1958), who for truncation at the left of this distribution furnished minimum variance unbiased estimates; of Crow and Gardner (1959), who in the estimation of a Poisson variable presented tables of two-sided confidence intervals relative to several confidence coefficients and all values of the variable from 0 to 300; and of Chakravarti and Rao (1959), who provided tables for several small-sample significance tests for the Poisson distribution as well as for two-by-three contingency tables.

Use of the multinomial model in decision making and classification was treated in three papers, those of Bechhofer, Elmaghraby, and Morse (1959), Kesten and Morse (1959), and Wesler (1959). In the first, attention was given to the selection of the multinomial event with the highest probability. In two closely related papers, Rao (1957, 1958) considered maximum

likelihood estimation for the multinomial distribution. Johnson (1960) described properties and applications of an approximation to the multinomial distribution.

Additional References: Crow (1958); Johnson (1959); Mendenhall and Lehmann (1960); Ramasubban (1958, 1959).

Developments in Nonparametric Statistics

Although attention given to nonparametric statistics was somewhat less than during the previous three-year period, a substantial number of papers appeared.

General and Theoretical Papers

Arguing against the compulsive use of nonparametric methods in place of classical parametric methods and for retention of the latter, despite the failure of the scale of measurement to be interval in form, were Cox (1958c), Gaito (1959), and Kogan (1960). Believing that nonparametric techniques should serve as exploratory or screening devices, Gaito urged that they be given limited use; Kogan (1960) cited the more extensive utility of parametric methods, and also the strikingly "rapid potency of the central limit theorem." On the other hand, in a detailed and systematic paper concerning a distinction between approximate and exact methods in nonparametric statistics, Sawrey (1958) strongly implied the importance of properties of the scale of measurement in the decision of the appropriate use of an exact or approximate nonparametric test, as did Senders (1958) much more explicitly in her textbook.

Among the most important theoretical papers were those of Savage (1957), who for various trend hypotheses considered detailed relationships among the probabilities of rank order with implications for admissibility of rank-order tests; of Rao, Savage, and Sobel (1960), who took up the two-sample censored case; and of Savage (1960), who furnished rules for the computation of rank-order probabilities with particular reference to the determination of the efficiency of Wilcoxon's two-sample test relative to the standard-normal test and *t*-test.

Making use of order statistics and of only the assumption that continuity exists in the marginal distributions, Dunn (1959b) developed estimates of joint (bounded) confidence intervals for the medians of a bivariate population. For the case of two independent samples, Birnbaum and McCarty (1958) described a numerical procedure based on an extension of the Mann-Whitney formulation for determining how large a sample would have to be to yield a distribution-free one-sided confidence interval of given width and specified level. Previously Birnbaum and Klose (1957) had given bounds for the variance of the Mann-Whitney statistic. To determine nonparametric tolerance limits, Somerville (1958) furnished useful tables.

Theoretical papers concerned with the concepts of power and efficiency included that of Chernoff and Savage (1958), who, for two absolutely continuous cumulative distributions of two sequences of ordered observations, considered properties of asymptotic normality and efficiency of several nonparametric tests following a certain form and that of Fraser (1957), who, in making use of an invariance principle, derived what he termed to be the most powerful tests for ranked data relative to normal alternatives. Witting (1960) developed a generalized efficiency measure for nonparametric tests based on the Pitman approach.

Significance Tests

Articles concerned with new nonparametric tests or with modifications of existing ones were numerous. Without making an assumption of either continuity or independence, Kuang (1960) derived a probabilistic inequality that indicates whether two samples can be contained in a certain class of distributions. In an ingenious development, Tukey (1959) proposed an easy and quick test to determine whether or not two independent samples come from the same population. He proposed summing the number of values in the first group (designated as the sample with the largest scale value) that exceed all values in the second group and then adding to this frequency the number of values in the second group not reaching the smallest value of the first group. For a two-tail test the critical frequencies in the total count are 7, 10, and 13 at the 0.05, 0.01, and 0.001 levels. To facilitate the comparison of changes in an experimental group with those of a control group, Silverstein (1958) urged the use of existing nonparametric tests once the differences between measures (changes) have been ordered.

In an expository and historical paper, Darling (1957) discussed the Kolmogorov-Smirnov and Cramér-Von Mises tests from the standpoint of goodness-of-fit and comparison of two samples. Other contributions pertaining to the Kolmogorov-Smirnov statistic included papers by Carvalho (1959), who presented a new derivation of the distribution of the statistic; by David (1958), who developed an adaptation of the test for three samples; and by Kiefer (1959), who furnished k-sample analogues for both the Kolmogorov-Smirnov and the Cramér-Von Mises tests.

Much attention was given to tests for comparing independent samples. In an informative article Kruskal (1957) described in historical perspective five independent proposals that anticipated Wilcoxon's unpaired two-sample test. For testing the hypothesis that two independent populations are unlike only in location, Sukhatme (1958a) studied the asymptotic behavior of the Mann-Whitney U statistic. Subsequently, Sukhatme (1958b) furnished a new nonparametric test for comparing variances and described a formula for its asymptotic relative efficiency. Also noteworthy in the instance of two independent samples was Halperin's (1960) extension of the familiar tests of Wilcoxon and of Mann and Whitney for samples that are censored at

identical fixed points, and he developed significance tables for sample sizes less than or equal to eight and for several degrees of censoring.

Resembling a one-way analysis of variance procedure for the comparison of several treatments with a control group when the numbers of observation are all equal is the multiple-comparison rank-sum test proposed by Steel (1959a), who discussed both the exact and approximate distribution and presented an example as well as a tabulation of critical values. In a later paper Steel (1960) proposed and illustrated a multiple-comparison rank-sum test that permits the simultaneous comparison of all possible pairs of treatments in a one-way classification when the numbers of observation are equal for all treatments. In a similar vein, Wallace (1959c) furnished an improved beta approximation to the Kruskal-Wallace test for a one-way analysis of variance ranks.

For matched samples, several innovations on the sign test and signed-rank test appeared. With respect to the hypothesis that the medians of two not necessarily independent variables have a particular value, Blumen (1958) developed a new bivariate sign test. In the instance of Hodges's bivariate sign test, Klotz (1959) obtained the complete null distribution from n equal to 1 through 30. Of considerable help to researchers are the tables for the sign test prepared by Arthur Cohen (1959) that furnish maximum likelihood estimates of binomial parameters when the probabilities differ from one-half. Extending the two-sample sign test to k-variate distributions involving three or more matched samples, Wormleighton (1959) proposed a test statistic based on study of tests of permutation symmetry that with an asymptotic chi-square distribution contains more degrees of freedom than Friedman's test and offers sensitivity to a larger variety of alternatives. Related papers were those of Steel (1959b), who developed a multivariate sign test, and of Walsh (1959c), who presented an exact nonparametric model in the instance of randomized blocks.

With regard to the signed-rank test, Walsh (1959a) attempted to clarify certain recent misunderstanding concerning the equivalence of Wilcoxon's test to a subclass of some tests that he had proposed previously and went on to demonstrate that his nonequivalent results contain useful properties superior to the information furnished by Wilcoxon's procedures. For the Wilcoxon signed-rank procedure, Pratt (1959) described ways for handling zeros and ties.

Tests of Randomness

That the study of randomness constituted an area of major interest was apparent from several papers. Two closely related studies by Barton, David, and Mallows (1958) and by Barton and David (1958) treated application of Wilcoxon's and the rank-test statistics, respectively. The substantive aspect of the two papers is a paired comparison task concerned with a sequence of two alternatives, such as the requirement for a judge to rank in order of age the pictures of N_1 men and N_2 women when in actuality all

individuals are of the same age. Obviously the null hypothesis of randomness is appropriate to ascertain whether the existence of bias on the part of the experimenter to judge women to be of higher or lower age can be inferred.

Likewise Goodman (1958) proposed a simplified-runs test and likelihood-ratio test of randomness in a sequence of two or more alternatives that could be simplified to significance tests similar to those applied to determine independence in contingency tables. In a paper related to the problem handled by Hotelling's T^2 statistic, Chung and Fraser (1958) proposed several nonparametric randomization tests for the multivariate two-sample problem—on the doubtful assumption, however, of independence among the variables—and offered a method for simplifying computations in the instance of larger samples.

The Tau, Rho, and Other Nonparametric Coefficients of Association

The most important article concerning measures of association was that by Kruskal (1958), who, in emphasizing both the probabilistic and operational interpretations of population values in conjunction with rank measures of association for bivariate populations, discussed comprehensively the quandrant measure, Kandall's tau, and Spearman's rho. Kruskal described their interrelationships, as well as their connections with certain measures of association found in cross-classifications; surveyed underlying sampling theory; developed an informative historical frame of reference; and stated his preference for use of tau instead of rho. Having 25,000 sets of correlated random normal deviates available, Fieller, Hartley, and Pearson (1957) investigated and compared the sampling distributions of three measures of rank correlation—Spearman's rho, Kendall's tau, and the Fisher-Yates index.

Studying the rank analogues of the familiar product-moment partial correlation, Somers (1959) showed that the ordinary product-moment correlation coefficient, rho, and tau are specialized cases of a generalized coefficient. Taking Somers's paper as a point of departure, Goodman (1959) presented significance tests appropriate to a number of different partial correlation coefficients that are related to tau.

Hays (1960) set forth an alternative measure of concordance which, though parallel to Kendall's coefficient W, is a function of the average Kendall tau coefficient among all possible pairs of judges; he suggested a significance test of this concordance index. To measure association in a contingency table with ordered categories, Karon and Alexander (1958) proposed a modification in Kendall's tau coefficient. Easing the computational effort in calculation of tau is Griffin's (1958) simple graphic method.

For the calculation of an average Spearman rho correlation between rankings on a criterion measure and a set of m independently made rank-

ings corrected for ties. Cureton (1958) developed and illustrated a formula. In the instance of nominal scales, J. Cohen (1960) presented a coefficient of agreement.

Regression and Correlation

In correlation and regression theory, an important general theoretical paper was that by Kiefer and Wolfowitz (1959), who considered optimum experimental designs and computational procedures in regression problems of estimation and testing of hypotheses from the standpoint of several criteria. Box and Draper (1959) described a design for fitting a polynomial to a true function with minimum error over a specified region.

For the situation in which samples are taken from bivariate non-normal populations, Srivastava (1960) carried out a theoretical investigation of the sampling distribution of regression coefficients. Additional contributions to the distribution theory were those of Williams (1959), who presented an approximate significance test for the difference between two non-independent correlation coefficients; of Hooper (1958), who investigated asymptotic variances of canonical correlation coefficients with applications to cases of both zero-order and multiple-correlation coefficients; and of James (1960), who studied the distribution of the latent roots of the covariance matrix.

In two other theoretical papers on multivariate analysis, Pillai and Samson (1959) developed expressions for the moments of Hotelling's generalization of T^2, and Lawley (1959) obtained results pertaining to the approximate distribution of canonical correlation coefficients.

Estimation of Parameters

Making use of the theory of least squares in relation to problems concerning linear hypotheses in multivariate analysis, Rao (1959) furnished estimates of parameters as well as test criteria when the variances and covariances, though unknown, can be estimated. Since the distribution problems pose no particular difficulties, valid inferences can be made by means of reference to available significance tables of t and F. Nicholson (1957) concluded that no use should be made of incomplete multivariate samples in problems of prediction, although under certain circumstances all the observations in an incomplete sample can be used to construct improved estimators.

For two variables with a bivariate normal distribution, Olkin and Pratt (1958) developed unbiased estimates of certain correlation coefficients and included tables to facilitate the process. Replacing a least-squares estimate by one quickly determined, Barton and Casley (1958) pointed to the applicability of the latter index to certain topics of censored data and its

consistency under the condition of a structural, rather than a regressive relationship between the dependent and independent variables.

In the instance of an exponential function, Finney (1958) described methods for estimation of a key parameter. In two particularly interesting papers based on economics research with implications for psychology, Quandt (1958, 1960) considered problems of estimating and testing hypotheses about parameters in a linear-regression system when, at a certain value for the independent variable, such as time, there is a suspected switch in the trend of the relationship.

For the situation in which two regression lines intersect, Kastenbaum (1959) furnished a confidence interval. The construction of confidence intervals with respect to arbitary real functions of multiple correlation coefficients was the subject of a note by Mandel (1958). Roy and Gnanadesikan (1957) also devoted efforts to finding multivariate confidence bounds.

Serial Correlation

There was less interest in problems of serial correlation than during the previous three years. Weinstein (1958) considered various definitions of the serial-correlation coefficient relative to the estimation of autoregressive parameters from a short time series, and, in terms of his examination of estimates obtained from three experimental series, concluded that the estimates are less influenced by changes in definition of serial correlation than by differences in basic method of estimation. He then introduced a new definition of the serial correlation. Siddiqui (1958) studied the distribution of a serial correlation, and McGregor (1960) proposed an approximation test for serial correlation in polynomial regression.

Regression Analysis and Prediction

A variety of problems was studied in the area of regression analysis and prediction. In the prediction of a continuous dependent variable from several independent variables (some of which are assigned dummy values corresponding to membership classifications as in a nominal scale), Suits (1957) described restraints that must be imposed upon the parameters of the regression equation in order that determinate estimates can be obtained. Cox (1958b) described methods of regression analysis for instances in which the dependent variable can assume only two values such as 0 and 1; subsequently he (1958d) extended application of his model to the analysis of two-by-two contingency tables involving matched pairs and to testing the extent of agreement between a binary sequence of observed values and a corresponding sequence of probabilities.

For treatment of certain types of experimental data, Williams (1958)

described how simultaneous regression equations could be employed, and expressed a preference for their use to use of the discriminant function. In estimating the regression coefficient of y on x, Cox (1960) showed how increased precision can be realized when prior information on a supplementary variable to which y and x are related is available. In a similar vein, Seal (1959) furnished and illustrated a model for a sampling plan that permits the obtaining of measures on an expensive variable from knowledge furnished by an inexpensive auxiliary variable with which the former variable is highly correlated.

Two contributions in regression analysis of particular interest to psychologists appeared. In their expository treatment of path analysis, Turner and Stevens (1959) used simple diagrams to explain the conceptual nature of cause and effect in regression analysis as well as to describe properties of feedback and homeostasis. In a critical discussion of their paper, Wright (1960) advocated the systematic substitution in path analysis of what he considered dimensionless path coefficients by corresponding concrete path regressions. The problem of covariance was the subject of the second important paper, in which Lord (1960) in the instance of large samples, presented formulas to allow for the fallibility of measures in the control variable—a circumstance that is particularly pertinent to many investigations in education and psychology.

How to select a limited number of predictor variables from a larger set in regression analysis was the central problem of three papers. Comparing both theoretically and numerically the Doolittle, the Wherry-Doolittle, and the Summerfield-Lubin methods of multiple correlation, Anderson and Fruchter (1960) demonstrated the equivalence of the latter two in selecting the same set of predictors in the same order and recommended the use of the Summerfield-Lubin formulation as the best least-squares procedure in view of its computational ease, compactness, and clarity of interpretation of interim values. Making use of the expected value of the size of a confidence interval over all possible regression samples and over all possible sets of predictors as a basic criterion for the precision of a selected set of predictor variables, Linhart (1960a) furnished and illustrated his method for determining which set of r variables out of k available randomly distributed ones should be chosen. In a related paper, Linhart (1960b) subsequently evaluated criticisms concerning the choice of a measure of predictive precision in regression analysis, and referred particularly to use of the expected value $E(1)$ of a confidence interval of width 1 for the variable to be predicted.

Computational and Graphic Aids

Allied to the three papers just cited were several others helpful in simplifying or reducing computational labor in regression analysis. The table prepared by Steck (1958) for computing trivariate probabilities has long

been needed. Greenberg and Sarhan (1959) discussed applications of matrix inversion in the analysis of correlational data. To obtain higher-order regression coefficients, Cowden (1958) described analogues to a method by which higher-order partial correlation coefficients are calculated from those of a lower order. Foote (1958) presented a simple desk-calculator method of obtaining multiple and partial correlation and regression coefficients that involves no back solution. In the analysis of several numbers of measures on the same individuals, Schutz (1960) presented a labor-saving technique that he referred to as the "little jiffy correlator."

For the determination of a multiple correlation coefficient $R_{1\,23}$, Waugh and Fox (1957) demonstrated a graphical method, and, in the instance of moving averages and adjustments in time series, Mincer (1957) showed how a graphical approach could be employed.

Curve Fitting

Contrary to the oversimplified impression conveyed by most textbooks, the fitting of a linear-regression equation customarily rests on the assumption of fixed, or error-free, values in the independent variables. That the fitting of a regression line is not a simple and mechanical process has been clearly set forth in a definitive and penetrating article by Madansky (1959), who considered the implications of presence of error in both the independent and dependent variables. He surveyed and evaluated solutions for determining consistent estimates of slope and intercept of regression lines from samples of paired observations when various assumptions regarding the properties of error and when various types of information are available for constructing consistent estimates. Pertinent to the problems just posed are the contents of the previously cited paper by Barton and Casley (1958), who furnished improved though rapid estimates of regression coefficients. On the other hand, in choosing to ignore the presence of error in the independent variable but to allow error in the dependent variable to be randomly distributed, David and Arens (1959) proposed criteria for spacing a given set of paired observations to achieve an optimal straight line. After pointing out that the true line may vary from experiment to experiment when a sequence of observations is taken over the same set of values on the predictor variable because of the presence of uncontrolled factors from one set of runs to another, Scheffé (1958) furnished a mathematical model for fitting the line relative to the hypotheses of equality of slopes of the true lines or an identity of the true lines.

For certain types of cumulative data in which the error of successive observations may not be independent, Mandel (1957) described two models for both independent and cumulative data and through them showed that the frequently used least-square estimates of independent error derived from the first model are not applicable to cumulative data conforming to the second model. In order to achieve a smoothing of probability-density functions, Whittle (1958) developed an equation that determines an op-

timal-weighting function. Citing certain pedagogical advantages, Karst (1958) described a method of linear curve fitting by means of which the sum of the absolute values of vertical discrepancies of points to the line is a minimum. Wagner (1959), also rejecting the least-squares approach, suggested two alternative criteria in linear-programing techniques for regression analysis. Askovitz (1959) presented short-cut techniques embodying centroids of sets of points that could be utilized in least-square applications of line fitting and in the determination of the mean of a frequency distribution.

Miscellaneous Articles

Making use of a table of random numbers, Hoffman (1959) described a procedure for constructing pairs of variables so that their correlation will be equal to any specified predetermined magnitude. For N distributions of variates, each based on the same population, Willis (1959) derived lower-bound formulas for the mean intercorrelation coefficient.

Representing a substitute for Fisher's well-known z conversion procedure, Nair's transformation of a correlation coefficient was studied by Sankaran (1958), who concluded that a corresponding inverse-sine transformation of this new coefficient in several situations is as satisfactory as Fisher's transformed coefficient. After introducing a family of modifications to Fisher's transformation of a correlation coefficient, Laubscher (1959) was able to show that within the family Fisher's form of the transformation is optimum.

Additional References: Finney (1960); Guttman and Guttman (1959); Ostle and Steck (1959); Rao (1958); Schaie (1958); Williams (1959a); Wright, Manning, and DuBois (1959).

Factor Analysis

Some of the problems involving communality estimation, rotation, and factorial invariance were clarified, and reformulations of the factor problem were offered. More researchers in education and psychology than previously used factor-analytic techniques. This section covers the most important methodological studies.

Communality Estimation and the Number of Common Factors

The problems of communality estimation and the number of factors to extract are inherently related, since estimation of the communality is made in order to define the common factor space. It can be safely stated that no solution for the communality problem has been found—and indications are that under the classical formulation of the problem none will be found.

Thus it is only natural that factor analysts turn toward redefining the concept of communality or toward attempting to determine the conditions under which prevailing attitudes do not seriously affect the psychological interpretations of factor structures.

Criticisms of the current factor theory are based on the following reasons: (a) formulation of the communality problem on the basis of minimal rank of the correlation matrix (Cattell, 1958; Guttman, 1958a; Wrigley, 1957a, 1959); (b) *a priori* acceptance of Thurstone's idea of parsimony (Guttman, 1958a, b); (c) definition of the term *communality* (Wrigley, 1957b); and (d) failure to take into account the stochastic properties of the measures used and their effect upon the final factorial structure (Wrigley, 1959).

In the use of communality estimates, Guttman's classic lower bound as given by the squared-multiple correlation between one variable and the $n - 1$ remaining variables seems to be firmly entrenched (Cattell, 1958; Tryon, 1957a; Wrigley, 1957a, b, 1958, 1959). After reviewing the communality formulations of Spearman, Thurstone, Guttman, and Tryon, Wrigley (1957b) stated that the squared-multiple correlation coefficient as an estimate of the communality in many ways overcomes the previous problems of communality estimation, because there are no alternative sets of diagonal values; the squared-multiple coefficient is probably less influenced by sample size (thus overcoming some objections to stochastic approaches), since values calculated from larger samples may be higher or lower. Thus the problem of determining the communality becomes separate from that of determining the number of factors. Wrigley pointed out the disadvantage of the lack of a test of significance, but left the solution of this problem to the statisticians. He also indicated the use of the squared-multiple correlation as an initial estimation of the communality in order to reduce the time involved when using Lawley's maximum-likelihood methods (Wrigley, 1958) and its correction by subtracting from such a diagonal value the mean of the rejected latent roots. Although Wrigley had stated that such use of the squared-multiple correlation produces good results, he pointed out that the communality might converge to an unlikely value, and that, since the communality based upon maximum likelihood depends on the size of the sample of persons, the twin decisions of communalities and the number of factors is confounded.

Wrigley (1959) also attempted to approach the communality problem as a function of the number of factors being extracted. His results indicated irregular increases in the communality as more factors were postulated. Moreover, while using Guttman's lower bound as an initial estimate, he found that some communalities eventually became greater than unity. The rate of convergence of the communality estimates appeared fastest when a small number of factors was hypothesized. In some cases the values had not converged after 80 iterations. His study also indicated that the last value obtained for the communality was a function of the initial communality estimate.

Approaching the problem of common-factor space from a different angle, Cattell (1958) called for the clarification of error factors and real factors, population factors and sample factors. Thus the problem is not reduced to attaining minimal rank nor to finding the standard error of a factor loading. In the process of separating real and error factors Cattell suggested that initial estimates of the communalities be based on the squared-multiple correlation and that concern be given to reproduction of the off-diagonal elements of the correlation matrix.

Guttman (1958a, b) criticized the desire that factorial research be based on the Thurstonian concept of parsimony, citing that all evidence which has been collected by methods outlined by Thurstone points toward negation of this idea. Guttman disproved that the rank of a correlation matrix may always be reduced to the smallest integer greater than $\frac{1}{2}(2n + 1 - \sqrt{8n - 1})$, but rather that the best possible upper bound is $n - 1$. He also postulated that for a simplex the rank can never be less than $n - 2$, but DuBois (1960) succeeded in providing an example in which Guttman's contention is not upheld. Further evidence by Kaiser (1960a) indicated that the alpha-reliability of a factor is depressed when communality estimates are made and when the number of factors extracted is small. In this light Kaiser suggested use of unities in the diagonals, a principal-axis solution using all factors having latent roots greater than one (1960b).

An attack upon the communality problem through a redefinition and generalization of the common-factor theory was proposed by Tryon (1957a, b, 1958a, b, 1959). Under his reformulation, Tryon (1957a) maintained that his three definitions lead to "precise" formulas for the determination of the communality (a) from the k necessary and sufficient dimensions derived by iterative factoring, (b) from the $n - 1$ remaining variable-domains, and (c) from the k' multiple clusters of the n variables. Kaiser (1959b), however, pointed out that convergence necessary under Tryon's formulation cannot always be reached with empirical matrices; in fact the solution for communalities converges if and only if the matrix has unique minimum-rank communalities. For clarification of the numerous cluster-analysis techniques, key-cluster analysis, total communality, cumulative communality, preclustered cumulative communality, and rational cumulative communality, the reader is referred to Tryon (1959).

Tyler and Michael (1958) reported an empirical investigation concerning the problem of communality estimation and concluded that for the matrix under study there appears to be no loss of psychological meaningfulness when either estimates of communalities determined iteratively or unities are used. Cattell (1958) also suggested the decreasing importance of the exact value of the communality from the empirical point of view if correlation matrices are large, when he indicated that the diagonal elements are only $1/n$th the number of elements in the matrix. However, Cattell indicated that the use of ones in the diagonal is unscientific, since it does not permit the separation of error factors from the common factors. An excellent review of the communality problem, its problems and meaning,

can be found in Dickman's (1960) dissertation, where a clear distinction is made between matrix, domain, and population-factor analysis.

For the researcher seeking to solve the problem of what should be placed into the diagonals, no exact answer can be given. Indications are that the insertion of Guttman's lower-bound value, the squared-multiple correlation, and the use of principal components having positive latent roots is the most reasonable and scientific approach at this time.

Rotation

During the last three years the formulation of one of the most adequate solutions to the problem of orthogonal analytic rotation has occurred. Unfortunately, the oblique case, although studied with much vigor, has not as yet provided researchers with a fully acceptable criterion despite Carroll's (1957) important advance.

The major significant breakthrough in the orthogonal case was given by Kaiser (1958) with his varimax criterion. The varimax criterion maximizes the variance of the squared elements by columns after each test has been corrected for uniqueness. (The correction is removed after rotation is completed.) Kaiser pointed out that not only is Thurstone's criterion of simple structure attained, but also the more important characteristic of factorial invariance is realized. Indications are that the varimax criterion has become well accepted by researchers using factor analytic techniques (Comrey, 1959; Dickman, 1960). Since the criterion to be maximized has been outlined for purposes of computer programing (Kaiser, 1959a), it should be made part of a basic computer library for those engaged in factor analyses (Kaiser, 1960b). Although Kaiser also generalized the varimax criterion to the oblique case (covarimin), indications are that it is biased in that the factors seem to approach a position tending toward orthogonality (Carroll, 1958).

After reviewing the problems involved with the analytic criterion as defined by his original quartimin and Kaiser's covarimin, Carroll (1958) proposed that a combination of these two criteria be used, for the quartimin produced an opposite bias to that of the covarimin criterion. Since the first term of Kaiser's covarimin function is the same as the complete quartimin function, Carroll proposed subtracting one-half the product of the sums of squared loadings from the covariance term. This new criterion for rotation is called biquartimin. Although it has been reported that the biquartimin has been very successful on Thurstone's box problem (Dickman, 1960), it has been suggested that the split between quartimin and covarimin is not equal and that, when the data are more complex, a larger part of the covarimin function is required. The biquartimin criterion requires that the sum of cross-products of squared factor loadings are minimized along with the sum of cross-products of deviations of squared factor loadings from their mean value.

After reviewing the inadequacies of previous analytic criteria (Carroll's quartimin as being too nearly oblique. Kaiser's covarimin as too nearly orthogonal) and pointing to the necessity for a variation in the proportion of combined criteria which change with the complexity of the tests, Kaiser and Dickman (1959) provided a new solution to the oblique case called binormamin in which the simplicity coefficient, or value determining the combinations of the covarimin and quartimin, varies as a function of the simplicity of the structure under study. The new approach uses the normalization step which has proved so successful in the varimax criterion. In effect, binormamin minimizes the sum of the cross-products of squared loadings normalized by rows and columns over all pairs of factors. The authors reported that binormamin is also subject to a bias which appears to be a function of the complexity of the tests. The bias is considered to be essentially nonexistent when data are cleanly structured but to be distinct for problems containing factorially complex variables.

Cattell and Muerle (1960) severely criticized present rotational criteria as constituting entirely the wrong functions to be maximized or minimized. Cattell stated that both simple structure and orthogonality are incompatible except in rare cases and that orthogonality is of little use for scientific work. Cattell proposed that the hyperplane count be maximized, that is, the number of near-zeros in the factor columns. Essentially Cattell proposed a compromise between subjectivity and mathematical rigidity.

With the advent of numerous analytic criteria for rotation and a greater stress upon psychological meaningfulness, a number of studies have been conducted to compare and to evaluate the effectiveness of each method. Wrigley, Saunders, and Neuhaus (1958) compared the quartimax rotation of the centroid factor loadings for Thurstone's *Primary Mental Abilities Test Battery* with the Thurstone simple structure method, Zimmerman's revised simple structure, Holzinger and Harman's bifactor analysis, and Eysenck's group factor analysis. The evidence indicated that the quartimax results agree very closely with Holzinger and Harman's and Eysenck's solutions and only moderately well with the two simple structure solutions. The authors pointed out further that, in terms of parsimony, the advantage seems to be with quartimax but that, in terms of factorial invariance, the varimax solution is much superior. Further study is required.

Kaiser (1960d) conducted a similar study of analytic rotations excluding both the Holzinger and Harman method and the Eysenck method from the comparison. Results indicated that psychologically there appeared to be no difference in the rotated solutions. However, it was emphasized that the merit of the varimax lies not in the observed similarities, but rather in the fact that the varimax is based on a scientifically more fundamental and more important criterion—factorial invariance. Further study with the varimax criterion was made by Comrey (1959) using data from the *Minnesota Multiphasic Personality Inventory*. Comrey reported that the varimax in general is more satisfactory than Thurstone's method and that, if a choice is available, the varimax rotation should be preferred. He also

suggested that it be used prior to oblique rotation when factor plots are to be made.

Of interest to those who do not have available electronic computers is the study by Fruchter and Novak (1958) who compared the 2 x 2 graphical method, Thurstone's analytic method, and a "direct rotational" method devised by Harris. Using as their criterion the principle of simple structure, the authors found that the graphical method is superior, but that the direct rotational method is the most economical of the researcher's time. Further work with the rotational method devised by Thurstone has been conducted by Sokal (1958). Sokal found Thurstone's results unsatisfactory because in some circumstances a given trial vector would not yield a reference vector with a well-defined hyperplane. This occurred because of the problem of collinear vectors, which makes it impossible to assure the correct selection of a reference vector for purposes of simple structure. Sokal's modification, which is restricted to calculation by electronic computers, considers all the variables simultaneously.

Working from the Gram-Schmidt method of establishing an orthonormal basis, Cureton (1959) adapted this useful mathematical technique to determine a transformation matrix that will rotate factors so that one of the new axes may be placed in a predetermined position. Such a technique may prove useful when a battery of tests includes "marker" variables.

In summary it may be stated that, for the orthogonal case, the normal varimax criterion appears to be in greater use than other orthogonal procedures. Unfortunately, since generalization to the oblique case has only been made by attempting compromises with previous orthogonal criteria, a definitive criterion is yet to be found. Electronic computers are an absolute necessity if current trends in analytic rotation continue.

The Common-Factor Problem

Increased use of factor analytic techniques has brought about the necessity for the comparison of factors among different studies. For the case involving different but not parallel tests for the same group, Tucker (1958) proposed the "interbattery" method of factor analysis. Tucker's procedure utilizes the correlation matrix between batteries of tests in determining the common factors rather than the more conventional manner of analyzing the factor structure of the correlations within batteries. The result permits consideration of those factors which are common only to both batteries. Although Tucker pointed out that this method requires no estimate of the communalities, Gibson (1960) has shown that, since certain assumptions made by Tucker may not hold, the communality problem must be faced. The Tucker method provides a statistical test for the minimum number of factors involved and for the calculation of the correlations between corresponding factors. Gibson (1960) pointed out that Tucker's method assumes that the vector configuration of the two tests within the factor space of overlap contains two sets of principal axes in the same location and also

assumes that their associated latent roots are identical. Gibson suggested that the problem can be overcome by selection of such test batteries that there exists a parallelism between sub-batteries so that their sums of squared loadings on a factor cannot be too different from any other factor. Gibson demonstrated that failure to create such a condition may lead to imaginary factor loadings.

General Computational Procedures

Wherry (1959) outlined a method of obtaining hierarchical factor solutions without the necessity for rotation. Instead of factoring and rotating the factor structure at each stage, inverting and normalizing the reference vector correlation matrix, and then refactoring, the Wherry method, which begins with the multiple group method of factoring, assumes that, if all overlap is removed from the clusters, they will have simple structure with respect to each other. In a short paper Wolins (1959) presented a modification of the Wherry-Winer method for factoring large numbers of test items. The new method appears much easier to use in conjunction with tetrachoric correlations.

Using the principle of maximum likelihood for the estimation of factor loadings when certain loadings are assumed *a priori* to be zero, Lawley (1958) concluded that factor loadings can be calculated under such an assumption for both the orthogonal and oblique cases. Lawley showed that for various hypotheses it is possible to solve numerically the maximum likelihood equations of estimation, but that the amount of work with matrices of even small order necessitates the use of an electronic computer.

Guttman (1959) pointed out that analysis of correlation matrices by factor analytic techniques is justified stochastically only if the regressions are linear, and he has shown that in general one set of new scores, at most, can be found to maintain the observed rank orders. Guttman posed and answered the following two questions: Can real numbers be assigned to given qualitative categories for a given population in such a way that the resulting numerical variables will have linear regressions on each other? If so, in how many ways can this be done, and what are they? He also pointed out that, if the question cannot be answered, nonlinear theories of scale analysis, latent structure analysis, or facet analysis are in order. In another paper Guttman (1957) presented empirical evidence of correlation matrices that conform to his radex theory. Two lists are cited, one representing approximate simplexes and the other approximate circumplexes. Fruchter and Fleishman (1957) reported a study in which they attempted to determine whether the presence of spuriously high intercorrelations among experimentally dependent variables distorts the common-factor structure of a battery. Results showed that the structure of the common factors is not greatly affected.

In an excellent article contrasting factor analysis and cluster analysis,

Tryon (1958b) described the method and theory underlying both "v-analysis" and "o-analysis." The "v-analysis" is concerned with grouping a minimal set of behavioral properties that are most independent and best predict the scores of the subjects. The "o-analysis" is a procedure for locating and conceptualizing types of objects or persons.

Madansky (1960) presented extensions of existing determinant methods for the solution of accounting equations in latent class analysis. McHugh (1958) also published a short paper outlining corrections of some of his earlier work on latent class analysis. He pointed out where stronger statements can be made about identifiability of structural parameters.

Gibson (1959) set forth an excellent outline of the theoretical formulations relating factor analysis, latent structure analysis, and latent profile analysis, and he attempted to show how the latter two models avoid the difficult problems of communality estimation, rotation, and curvilinearity that plague conventional factor analyses. Limitations of the latent profile analysis were pointed out as being: (a) lack of a scale of measurement for the latent continuum and (b) definition of the number of necessary latent dimensions since as many as $q - 1$ dimensions would be required, where q is the number of latent classes.

Maxwell (1959) recently outlined a number of statistical tests which he considers ought to be used by factor analysts, in view of the fact that factor analysis lacks the sophistication of classical statistical methods in not having such information as the standard error of a factor loading. Significance tests for an entire correlation matrix, for the comparison of two variance or covariance matrices, and for residual matrices were given.

Hotelling (1957) explained that in many instances certain statistical procedures, such as regression analysis, multiple correlation, and multivariate analysis of variance, are more appropriate techniques than factor analysis. In attacking the problem of dimensionality of a continuous multivariate population, Hotelling pointed out that the rank is equal to that of the sample under certain conditions, provided the number of degrees of freedom among subjects is greater than the number of variables. However, when the observed score is considered to be made up of a real part and a random error, dimensionality can only be ascertained by obtaining estimates of the errors by suitable replications and the use of multivariate analysis rather than by factor analysis. Hotelling also suggested a method for comparing covariance matrices using the characteristic equation and distributions of the latent roots.

Additional References: Other references of general interest, which are worthy of reading particularly by those interested in empirical examples or by those who are only beginning their study of factor analysis, include the contributions of Bernyer (1957); Borgatta (1958-59); Dingman (1958); DuBois and Manning (1959); French (1959); Garside (1958); Kline (1959); Michael (1958); and Royce (1958). Somewhat more mathematically oriented articles are those of Baggaley (1960); Bernyer (1958); Demaree (1957); Hamilton (1958); Tucker (1958).

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CHAPTER V

Research Tools: Access to the Literature of Education

MARGARET B. SHEVIAK and HAYNES MCMULLEN

THIS CHAPTER is a sequel to "Research Tools: Library Resources" by Pierstorff (1957) in this REVIEW. There have been no startling changes during the last three years in the bibliographical apparatus for obtaining access to the main body of educational literature, but two trends are likely to be of considerable interest in the future. The first is the increasing amount of information available about educational systems outside the United States; the second is the development of machines and systems of searching which permit quick access to ideas and combinations of ideas not easily located through conventional bibliographies, indexes, or abstracts.

This chapter will discuss first the newer conventional bibliographical and reference aids which are primarily useful in the study of education in the United States; then the aids which are mainly useful in international studies; and, finally, the literature on systems for the mechanical indexing and searching of literature. Cumulative bibliographies which were discussed in Pierstorff's article and which are continuing without change are not considered here.

General Guides to Library Resources

Winchell (1960) completed a third supplement to her annotated guide to general reference works, and Barton (1959) prepared a fourth revision of her briefer bibliographical guide to reference books. Walford (1959) edited a comprehensive guide to reference books and bibliographies with emphasis on current material and on material published in Great Britain. Another comprehensive and detailed bibliography of basic reference works prepared by Murphey (1958) is especially well adapted for general use, because it is arranged from the viewpoint of the nonspecialist, its terminology is nontechnical, and it offers guidance in the mechanics of research and in the preparation and style of research papers.

The compilation of doctoral dissertations in the *Index to American Doctoral Dissertations* (1956, 1957, 1958, 1959) served the dual purpose of continuing *Doctoral Dissertations* compiled by Trotier and Harman and indexing dissertations abstracted in *Dissertation Abstracts*. The form and features of the previous volumes sponsored by the Association of Research Libraries have been retained in the main. A serious omission in the 1958-59 *Index* was lack of a page reference to the place in the volume where a dissertation was abstracted.

A selective list of the major abstracting journals and bibliographies for each of the social sciences was compiled by Clarke (1959). Fellows (1957) included 167 items in his guide to periodical publications intended as an aid to the study of current developments in the social sciences.

The General Field of Education

Alexander and Burke's fourth edition (1958) of their valuable aid to the researcher lists many changes in sources for the location of educational information. A full index facilitates finding a reference for which the researcher remembers only the popular title or the author. Napier (1958) provided a shorter descriptive list of sources, with emphasis on British publications.

The second edition of Good's *Dictionary of Education* (1959) contributed to a solid base of educational vocabulary. The fifth edition of *Mental Measurements Yearbook* (Buros, 1959) covers the years 1952-58. The *Encyclopedia of Educational Research* (Harris, 1960) appeared in a third edition under new editorial direction, with a number of new contributors. Contributors to earlier editions developed new treatments of their topics. The results of a symposium on important aspects of current educational research were presented by Phi Delta Kappa (Banghart, 1960).

Two continuing bibliographies mentioned by Pierstorff changed title or editorial direction. *Education in Lay Magazines* (National Education Association, 1957, 1958, 1959, 1960) ended with No. 2, 1960, and was continued as *Magazine Report*. The annual bibliography of master's theses that had been compiled by Lamke and Silvey (1957, 1958) appeared with Silvey (1959) as sole editor.

Special Fields in Education

Eells (1959a) presented an annotated bibliography of books and periodical articles devoted to college teachers and college teaching methods, which included studies appearing in periodicals, as well as published and unpublished theses. "Index B" separately lists the doctoral dissertations in these areas. Scates and Ellis (1957, 1958, 1959) also provided a bibliography of the same matter.

Mezirow and Berry (1960) compiled a comprehensive guide to articles, government publications, pamphlets, and books in major areas of liberal adult education, abstracting most items. It covers publications from the United States, Great Britain, and Canada since the end of World War II.

A series of annual bibliographies of reports on research (articles and theses) in health, physical education, and recreation was begun by Hubbard and Weiss (1959, 1960). The theses were abstracted by the institutions at which they were written. Hilton and Fairchild (1960) and

Forrester (1958) revised earlier compilations of guidance and occupational literature.

Psychology

An annotated list of reference books and a list of psychological journals were included in Daniel and Louttit's guide for researchers in psychology (1953). The book surveys psychological literature and provides technical and stylistic aids to scientific reporting. An appendix includes sources for books, tests, apparatus, equipment, and supplies. English and English (1958) produced a compact dictionary of terms used in psychology, as well as some from mathematics, medicine, and psychoanalysis.

Directories

The *Directory of University Research Bureaus and Institutes* (1960) identifies and describes current research programs in institutions of higher learning in the United States and Canada. It includes bureaus, institutes, experiment stations, laboratories, and other research organizations which are sponsored by colleges and universities, established on a permanent basis, and carrying on continuing research programs. Appendixes list university presses and members of the National Council of University Research Administrators, and indexes provide location by name of institution and geographic area.

Ash (1958) compiled a guide to special book collections with subject emphasis as reported by university, college, public, and special libraries in the United States and Canada. The *Association Index* (1958) records —by author, title, and subject—directories, yearbooks, and periodicals listing nongovernmental associations.

Education Outside the United States

The most significant of recently published aids to the study of education outside the United States is UNESCO's monumental volume on primary education (1958), the second in its *World Survey of Education* series. For each country, it contains a monograph, usually complete with tables, charts, bibliography, and glossary, with some information about the past and much about the present status of education, predominantly but not exclusively elementary education. The two latest editions of UNESCO's *Basic Facts and Figures* (1959a, 1960a) have been in English; some earlier editions were in French and Spanish. About a fourth of the tables in the latest volume are on education.

UNESCO was responsible for two helpful directories, one giving brief information about educational associations in many countries (1959c)

and the other giving full information about clearinghouses and documentation centers throughout the world (1957).

Of bibliographies of international education, the most comprehensive is an annotated volume begun by Heath (1957, 1958) of the Division of International Educational Relations in the U.S. Department of Health, Education, and Welfare, Office of Education (1959). UNESCO published a partly annotated list of texts (1960b) on research methods and, for each of several countries, references to review articles summarizing educational research, bibliographies of research, and the names of journals which regularly contain reports on research. Eells's long list (5700 items) of American theses on education outside the United States and on the education of foreigners within the United States (1959a) contains no annotations but helps identify elusive sources of information. The part of this list about scientific and mathematical education in foreign countries was issued separately (1959b). UNESCO published another specialized bibliography which lists books, journals, and articles on technical and vocational education in several regions and many countries (1959b).

Literature Searches by Mechanical Means

Most methods and machines used by industrial firms and government agencies to search scientific and technical literature are completely adaptable to searching educational literature. One unfamiliar with the subject should prepare himself with a glossary; the latest and best is Wagner's (1960). No single book, journal, or index, however, suffices as an introduction to this rapidly expanding field of technology. A survey of many systems now in use and experiments in progress was given by papers presented at two symposiums and edited by Shera, Kent, and Perry (1957) and Boaz (1959).

Advances in methods for the mechanical searching of literature are described in *Scientific Information Notes* (1959); 58 systems now in operation were described more fully in two pamphlets in the series, *Nonconventional Technical Information Systems in Current Use*, compiled by Berry (1958a) and by Henderson and Ripple (1959b). Experimental progress is described in *Current Research and Development in Scientific Documentation* compiled by Berry (1958b), by Berry and Haksteen (1958), and by Henderson and Ripple (1959a, 1960). The latest issue contains notes, averaging a page in length, about more than a hundred projects. Some of these operational and experimental systems are described more fully in such periodicals as *American Documentation* (1950 ———), which also carries abstracts of articles appearing in other journals.

Most systems for literature retrieval involve the use of statistical machinery or computers. Many educational research workers are likely to be interested in less elaborate and less expensive systems designed to

index collections of 10,000 items or less. Marginal punch cards have been in use for many years and are adequate for bibliographical control of small collections of articles or reports. One of the many descriptions of applications of punch cards for indexing, Milne and Milne's (1959) article revealed errors made in designing a system which used about 4500 cards.

Soper (1955) described an unusual system of superimposed coding called co-ordinate indexing. It allows greater flexibility and precision than most systems and is adaptable to both manual and machine use. Its application to the indexing of a small collection of articles was described by Wilkinson (1959), and its capabilities were explored in detail by Taube and associates (1953, 1954, 1956, 1957, 1958). Zatocoding, a relatively simple system in which a machine sorts marginal punched cards, was described by Shera, Kent, and Perry (1957) and in detail by Mooers (1956).

Among descriptions of applications of computers and similar machines to literature searching, the series of articles by Faden (1959a, b, c, d) is helpful in summarizing information up to the programing stage. Machine translation, not yet of much concern in education, may become more consequential. Delavenay (1960) gave a unified and understandable account of progress to the end of 1958. The most satisfactory index for material in this field is the *Applied Science & Technology Index* (1960 ——), which covers material from 1959 to the present.

Summary

During the last three years, access to the literature of education has been facilitated by a continuing stream of new bibliographies and guides, including new editions of standard works. Bibliographies appeared in the fields of adult education and health, physical education, and recreation. A variety of statistical and bibliographical works on international aspects of education have rolled from the presses of UNESCO. And, if all these guides prove inadequate, the researcher can turn to one of many mechanical aids.

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CHAPTER VI

Research Tools: Observing and Recording Behavior

JOHN WITHALL

IT APPEARS THAT, at long last, researchers have taken to heart the dictum credited to Kurt Lewin that there is nothing so practical as a good theory. Some research reported gives distinct signs of having been guided by implicit theories or models. The theories are by no means full-blown but seem to be in the process of development and formulation. The upshot is that some, though not all, of the research activity noticed here has been conducted within a framework that is sociopsychologically oriented and process oriented.

What might be called, after Jahoda, the multiple-criterion approach seems to be implicit in some theories. Educational researchers appear to have arrived at the point with respect to instruction that Jahoda (1958) has arrived at with respect to the concept *mental health*, namely, that a multiple-criterion approach is needed to better understand, control, and predict variables in these global phenomena. The current thinking seems to be that these all-encompassing and relatively meaningless concepts have to be broken down into manageable, discrete, describable operations or behaviors. This, in connection with instruction, necessitates the specifying, describing, and quantifying of the behaviors of teachers and learners under defined and described conditions.

This chapter (a) offers a brief historical backdrop to current efforts at identifying, assessing, and quantifying teacher-learner interactions in the classroom; (b) identifies some of the major studies that have developed methods and instruments for observing and recording classroom behaviors; and (c) indicates the directions in which present trends in research seem to point.

Backdrop to Current Research

Research on teachers and learners in the classroom has moved in stages. At the outset, with a nod toward learners as if they were all of the same mold, there was the listing of teacher traits by supervisors and administrators and sometimes pupils. Next came the stage of identification of words or phrases that teachers used which appeared to bear on the behavior and quality of learning. Another was that of studying child growth and development to better understand what went on in the educative process and to give some guidelines for classroom procedure. This tack tended to displace and cast into disrepute the *tabula rasa* concept in the learning relationship. There followed a sociometric-analysis stage, when individuals were seen as members of a social group in the

learning situation. Finally, the findings of social psychology were utilized, and researchers studied classes of pupils as groups and analyzed the interaction of the participants in this social milieu with particular attention to the role and functions of both teacher and learners in the educational process.

Melby wrote in 1936: "One interesting outcome of the application of the various techniques for analyzing and describing classroom procedures seems to be the general disappointment with the conditions they reveal [which] tend to show an enormous lag between our theory and practice in education. . . ." This stricture seems to be as relevant today as it was 25 years ago. We have just begun to develop some bench marks in our efforts to assess, measure, and make predictions about classroom learning and teaching, with the help of other disciplines, especially social psychology, anthropology, and sociology. These have afforded us some guides to identification and analysis of classroom variables that influence learning. Some of these, which may be subsumed under the rubric of group influences, include the feelings and perceptions of learners and teachers; the roles which teachers and learners take in the classroom; the interpersonal interactions of teachers with learners and learners with learners; and the influence of the peer culture and of social class and differing cultures, along with the pervasive influence of values and value systems.

Dewey's theories of learning and his philosophy of education are supposed to have helped educators conspicuously to conceptualize the learning process as one in which the learner plays a major role, where problem-solving techniques are a major vehicle of learning, and where self-guided, functional, pragmatic learning eventuates. If Dewey's operationalism is a guiding tenet in today's schools—and Dewey is generally held responsible for the *emasculation* of our educational system, in terms of lowered academic standards, cavalier treatment of subject-matter mastery, and decline of the mental discipline—it would take some doing to demonstrate that this is so in the light of what is taking place today. For the ways in which teachers teach and the manner in which educational researchers have gone about their research indicates that until quite recently there has been incomplete understanding of the pragmatism, operationalism, problem solving, and self-directed activity for which Dewey is held responsible.

It is astonishing and discouraging, as one examines the research of the past and the near-present, to discover how little attention, relatively, has been paid to the major variables in the teaching-learning process—the teacher, the learner, and teacher-learner interaction. Until recently, researchers have consistently concentrated on the influence of such matters as personality traits of teachers, spaced periods of learning as opposed to concentrated periods of learning, individualized versus mass instruction, lecture versus discussion techniques in the classroom, and audio-visual aids and their contributions to the learning process. No one would have denied the fact that the teacher (as well as the learner) was an

important factor, but it was assumed that the teacher's own unique impact and influence could be taken as a given factor, just as learners had been perceived as similar if not identical entities in the past.

Social psychology gave increasing emphasis to leadership on the part of the teacher and to the impact of the group and its social-emotional climate on the roles and behaviors of teachers and learners and on the life pattern and achievement of each learner. These focuses of concern lately have been accompanied by interest on the part of educators and educational researchers in the influence of group experiences and activities on learning in the classroom and also on intergroup education and intercultural relations. The insights derived from group therapy were also related to educational procedures and problems. Sometimes they appeared in life-adjustment education, and most recently they emerged in the principle that the individual's personal-social needs must be met before he can marshal his problem-solving skills and fulfill his responsibilities for content mastery.

Historical Perspective

As historical background for examination of current attempts to develop techniques and instruments for observing and recording teacher and learner behaviors in the classroom, the major studies since 1930 are cited.

One of the earliest attempts to devise a procedure for examining specific teacher behaviors in the learning situation was Johnson's (1935) study of the teacher's verbal directions to children aged three to seven. She found that explicit directions or requests to individuals given in an unhurried, positive, and encouraging manner ensured much greater success in performance than vague, hurried, and discouraging verbal directions. Olson and Wilkinson (1938) found teaching effectiveness related to the amount of verbal control in the classroom which could be described as positive and directing. The teachers who used blanket and generalized statements were less efficient teachers. The more able teachers used a larger proportion of guiding and approving statements.

Anderson and his colleagues (1939, 1945, 1946a, b), postulating that the main direction of influence is from teacher to pupil, developed teacher-behavior categories to measure this influence objectively. Anderson identified 26 categories with which he assessed teacher influence on pupils' behaviors and differentiated teachers on the basis of the relative number of integrative (sympathetic, encouraging, friendly) and dominative (deprecating, authoritarian, unfriendly) contacts they had with children. Concomitant differences in children's behavior were identified. It was demonstrated that children who were exposed to more integrative teacher behaviors showed lower frequencies of distracted and nonconforming behavior and significantly higher frequences of spontaneous, co-operative,

and self-initiated behavior. Anderson, Brewer, and Reed (1946b) said: "The ultimate objective of these several researches has been to produce measures of teachers' classroom personalities that would have practical usefulness for research workers, for school administrators, and for teachers themselves."

Lippitt (1940), in experimentally controlled group situations, assessed the impact of democratic, autocratic, and laissez-faire leadership styles on the cohesiveness of small groups of boys and on their interpersonal and problem-solving activities. In the light of Lippitt's work and Anderson's premise that the main direction of influence in the classroom is from teacher to pupils, Withall (1948, 1949) developed a seven-category instrument to assess classroom verbal behaviors of the teacher in terms of their learner-centeredness or teacher-centeredness—that is, whether the inferred intent of those verbalizations was to encourage and enhance the learning and achievement of the pupils or enhance and strengthen the goals and status of the teacher.

Flanders (1951) followed this with an investigation of the influence of experimentally induced anxiety, as evidenced and measured by increased pulse rate, galvanic skin response, and a graphic record of introspectively perceived and reported positive or negative feelings of the learners. Perkins (1951) and Glidewell (1951) pursued different and related facets of the same problem. Thelen, who guided and helped facilitate these researchers in his laboratory, has pushed further in the exploration of the sociopsychological variables influencing individual learning and group achievement.

Cornell, Lindvall, and Saupe (1953) developed an instrument to focus on eight dimensions in the classroom with particular reference to teacher-pupil interaction. The dimensions included social organization in the classroom, initiative of the pupils, competency of the teacher as indicated by differing performances in terms of selected behaviors, and classroom climate as reflected in the behavior of the pupils and as shown in the behavior of the teacher. Thirty-two classrooms were observed, and the instrument significantly discriminated among them. The authors indicated that revisions of the instrument seemed desirable and that an inventory administered to students on their perceptions of the classroom situation may be as valid as the observation device.

Hedlund (1953) developed an instrument to identify critical incidents or behaviors which enable principals, educational experts, and pupils to distinguish effective and ineffective teachers. Some 4600 descriptions of effective and ineffective behaviors by teachers were reported. They fell into 68 specific behavior categories. After considerable sifting, winnowing, and testing, 43 behavior items emerged with strong predictive value, some useful for both sexes and some for one sex only. Ultimately, a predictive index comprising 18 of the best predictive items for each sex was worked out. Hedlund observed that, although his findings were encouraging, they needed to be cross-validated.

Conceptual Frameworks

In accordance with the emergent sociopsychological, process-oriented, and multiple-criterion approach to the study and assessment of the teaching-learning process, Jensen (1955, 1960) identified the need for a framework of concepts that could be used to analyze classroom behaviors systematically. Taking the needs approach and examining learners both as individuals and as group members, he specified seven dimensions: problem solving, authority-leadership, power, friendship, personal prestige, sex, and privilege. He contended that class productivity, individual achievement, and member satisfaction with the class arose from the diverse relationships of the seven different dimensions, and he offered a promising framework in which to assess the influence of social interactions in the classroom and the resultant influences on group performance and individual learning. He underlined, as Jennings (1947) had done, the importance of there being a network of relationships in the learning and problem-solving group that ensure that both individual needs and group needs are satisfied so that the objective problem solving, achievement-learning, and related work tasks are dealt with effectively. Getzels and Thelen (1960) summed up prevailing opinion on a process, sociopsychological approach to classroom learning, and described nomothetic, idiographic, and transactional styles of teaching. They identified the transactional style as striking a balance between promotion of students' achieving personal goals and requirement of their mastering subject matter in the classroom situation. In their view, the most viable instructional setting is one in which both the individual's self-development goals and content-mastery goals are attained. They emphasize, moreover, that the individual's self-needs must be met before progress can be made in content mastery.

If an educational theory—that is, a systematic portrayal within an integrated framework of a number of variables to demonstrate the relationships among these variables, as well as their relationships with other factors such as knowledge, attitude, and skill outcomes—is to be formulated, then the kind of concept identification and integration which Jensen, Thelen, and Getzels have set forth in their recent writings seem to be the *sine qua non* of such theory development.

Research Influenced by a Sociopsychological Rationale

Considerable research has been done to assess the variables of the teaching-learning process from the vantage point of the developing sociopsychological framework. In such studies cognizance is taken of the interaction of personal-social and achievement-learning needs in the context of classroom instructional process. Flanders (1959, 1960a, b) focused on aspects of the transactional type of teaching—that is, on teacher be-

haviors which control and delimit the students' freedom of action as contrasted with those which invite and encourage activity and spontaneous participation by the learners. He (1960b) developed 12 categories for analysis of the influence pattern of the teacher, basing them on constructs and categories of Anderson (1939), Withall (1949), and Bales (1950). Flanders's 12-category system assesses direct and indirect influence of the teacher's talk, as well as the students' talk, according to whether it is responding to or initiating behavior. It identifies, along with other things, teachers who are parsimonious with praise and encouragement and show little interest in the affect side of the students' learning activities, and thus the system has considerable significance for the current research in the mental-health impact of teachers' classroom behaviors. Flanders's interaction analysis technique affords: (a) operational definition of teacher behaviors and (b) a way of quantifying the behaviors that contribute to the dynamic interaction of the participants in the teaching-learning process.

Damrin (1959) developed an instrument, under the name of the *Russell Sage Social Relations Test*, to measure the competence and skill of elementary-school youngsters in group planning and group work. The test, which involved three construction problems with miniature blocks, comprises a planning stage in which the group decides how to construct the figure and an operations stage in which the figure is constructed. No limit is set on the time to be used in planning, but 15 minutes is allotted to the operations stage. During both the planning and the operations stages an observer keeps a record of behavior on standard observation sheets. Some concomitant indicators of the reliability and validity of the instrument have been set forth, and work is under way to vigorously test the technique statistically. Seven types of groups emerged from the planning stage: (a) mature, (b) dependent, (c) immature, (d) semicontrolled, (e) semirestrained, (f) uncontrolled, and (g) restrained. Nine types of groups emerged from the operations stage: (a) mature, (b) immature, (c) disinterested, (d) rollicking, (e) excited, (f) rowdy, (g) suppressed, (h) bickering, and (i) quarreling.

The instrument looks promising in that it draws on sociopsychological concepts and focuses on specific, observable behaviors in terms of sociopsychological context. Drawbacks at this stage are lack of evidence regarding its validity and reliability and the necessity for two highly trained and skilled individuals to administer the test and record the subjects' behaviors. The former drawback is being dealt with, and the latter arises with the use of any worthwhile testing, observation, and recording process so far devised. The promise of the instrument lies partly in the fact that it deals with the measurement of social and psychological forces and gives evidence of being applicable to other age levels, including adults.

Gold (1958), working within the framework of an interactional theory of leadership, examined the learning situation to determine what variables influence the status and roles of children in the classroom. He used the

concepts of power, properties (attributes or qualities), and resources (abilities valued by the peer group) possessed by children to analyze the social relationships of those youngsters in classroom groups from kindergarten through grade 6. Seventeen characteristics of children deemed important by their peers were identified. These included such characteristics as "smart at school," "acts friendly," "knows how to act so people will like him," and "does things for you." Pupils were asked to assign these traits to others in their class. The results of the study indicated ". . . a relationship between the values of the children in our study, the properties perceived to be possessed by the children and the power structure of the classroom group. . . ."

This study placed considerable emphasis on the peer-group influences in the learning situation which, it cannot be denied, exerted considerable influence on the child's status in the classroom. It also seems clear that the peer-group values of children influence their openness to learning content, attitudes, and skills. In many respects the pupils with power serve as gatekeepers to the learning of the knowledge the teacher is trying to impart. This emphasis on peer-group influence in the learning situation underlies its role as an instructional vehicle.

Zander and Van Egmond (1958) examined the relationship of intelligence and social power (ability to get others to do things) of 418 children in grade 2 and grade 5 classrooms. They hypothesized that the cultural expectations for boys to be self-reliant and to strive for achievement were easily realized if the boy possessed either social power or intelligence and that society's expectations for girls to be obedient, nurtural, and responsible required neither social power nor intelligence. Data included *Kuhlman-Anderson Test* scores, peers' ratings of four characteristics, observed behavior in small work groups, and teachers' ratings of seven social behaviors. The findings were that: (a) social power is not highly correlated with intelligence; (b) those with greater social power were better liked regardless of sex; (c) boys won social power by being threatening, and girls by doing well the things required of them; (d) boys low in social power and intelligence were like girls in their quiet, unassertive patterns of behavior.

Shapiro, Biber, and Minuchin (1957) described an instrument, the *Cartoon Situations Test*, developed for the purpose of predicting teaching success. The dimensions assessed by the instrument include the prospective teachers' quality of expressive tone, orientation to dilemmas, quality of emotional identification with characters in the cartoon, perception of the authority role, quality of psychological thinking, orientation to action, mode of aggressive expression, and attitude toward socialization. The kind of affect projected into the cartoon situation seemed crucial, as did the absence of expression of hostility. The findings indicated that the instrument has predictive value; its use is being further explored.

Haigh and Schmidt (1956) examined the relative effectiveness of teacher-centered and group-centered classes. Students were placed in

teacher-centered and group-centered classes according to their stated preferences. The group-centered class was not required to take a final examination. The *Horrocks-Troyer Test* was given to all subjects at the end of the experiment, which ran one academic year. There appeared to be no significant differences between the two groups in subject-matter learning.

Maier and Maier (1957) compared the effects of two leadership-discussion techniques on group decision. One technique afforded free discussion in a permissive manner; the other entailed the leader's breaking a problem into parts and keeping all group members together in considering it. A significant difference was obtained in the quality of decisions of the two groups: twice as many of the developmental discussion group members as the free discussion group members reached a high-quality decision. The generalizability of these results is limited; the authors believe their findings applicable only to problem solving in which there is little or no emotional involvement.

Calvin, Hoffman, and Harden (1957) tested the hypothesis that a permissive social climate enhances the achievement of high-IQ subjects and handicaps subjects with only average intelligence scores. Their conclusion, reached on the basis of a trend occurring in all their experiments and not on the basis of an acceptable level of statistical significance, was that findings supported the hypothesis.

These studies on the effect of teacher-centered versus learner-centered group atmospheres and on permissive as opposed to structured teaching methodologies throw some doubt on the assumption that permissive and learner-centered instruction inevitably leads to better learning and achievement.

Getzels and Guba (1955) used a 71-item instrument that dealt with the socioeconomic, civic, and professional roles of the teacher in terms of their situational and personal aspects. They found the teachers feeling troubled at the role conflicts they experienced.

Trow (1960a, b) assessed the several functions and roles of the teacher and related them to the teacher's skill in effectively implementing the roles. He emphasized the inescapable teacher-learner relationship of controller to controlled, superior to subordinate, and the central roles of the teacher in this context as therapist, strategist, and instructor. Trow and his colleagues have consistently emphasized the sociopsychological framework for the study of the learning process in the classroom, and have pioneered some of the work and findings emerging from this framework.

A Multiple-Criterion Approach— Operational Definitions of Classroom Interaction

Hughes and associates (1959), proceeding from the assumption that the teacher cannot speak or act in the teacher-learner situation without performing a function for someone in the situation, developed a code for

the analysis of teaching. The subjects were 21 teachers judged "good" by administrators and supervisors from several schools and 10 teachers representative of one school. Focusing on the behavior of the teacher as reported by two trained observers in narrative form, Hughes identified 31 functions which the teacher fulfilled vis-à-vis specific individuals in the classroom. She examined the problem of each teacher-act's having a multi-pronged effect on pupils in a classroom. She confined herself, however, to interpreting the act as performing a function only for the particular individual or individuals to whom the act was directly addressed.

The 31 functions were subsumed under seven categories: (a) controlling, (b) imposition of teacher, (c) facilitating, (d) developing content, (e) response, (f) positive affectivity, and (g) negative affectivity. Conclusions reached were that there are few "good" and few "bad" teachers, that criteria used by administrators for judging "good" teachers are compounded of many elements and are not comparable, and that the relationship of the teacher to child reflects to a marked degree the adult-child relationship of our culture. Some conclusions were actually opinions and went beyond the data presented.

Wright (1959), studying verbal behaviors of secondary-school mathematics teachers, used three frames of reference for assessment: ability to think, appreciation of mathematics, and attitude in terms of curiosity and initiative. If the verbalization did not fall into at least two of the frames, it was categorized as neutral. The instrument appears to have several limitations: (a) the observer must be trained in the specific subject matter; (b) he must be trained only by the researcher who developed the instrument; (c) he is required to interpret and infer as he categorizes; (d) large amounts of time must be devoted to the observation of each classroom.

Medley and Mitzel (1958) developed the *Observation Schedule and Record* (*OScAR*) by modifying the classroom observational procedures of Withall (1948) and Cornell, Lindvall, and Saupe (1953). The observer records both teacher and learner behaviors under an Activity Section which identifies 44 possible activities of teacher and pupils. He next employs the Grouping Section of the instrument to identify and list large and small groups and to note acts of individual pupils. He then notes in the Materials Section the type of instructional materials used. Finally, he enters in the Signs Section items symptomatic of classroom climate. Differences between classes can be identified, it is maintained, with fewer than 14 variables. A study of the factorial structure of the 14 scoring keys indicated that the *OScAR* technique gives reliable information about three relatively discrete dimensions of classroom behavior—the social-emotional climate, the relative emphasis on verbal learnings, and the degree to which the social structure centers about the teacher.

In a subsequent study Medley and Mitzel (1959) tried to identify the relationship between some measures of teacher effectiveness and some teacher-behavior variables. They compared pupils' reading growth, prob-

lem-solving skills, pupil-teacher rapport, teachers' self-ratings, and principals' ratings with teacher behaviors associated with emotional climate, emphasis on verbal activities, and social organization. Their findings indicated that supervisors' ratings for evaluating learning are inadequate. They questioned the relevance of a considerable body of research that has used ratings of some kind as a criterion of teacher effectiveness. They also found that gains in reading and gains in group problem-solving skills seem unrelated to recorded classroom behaviors of teachers and pupils.

More studies of this sort attempting to relate learner achievements to identified behaviors in the classroom may dissuade researchers from employing designs which involve ratings to assess variables. Despite the fact that a number of studies, such as those of Brookover (1940), Jayne (1945), Lins (1946), and Anderson (1954), have indicated the questionable validity of ratings and checklists, such ratings and lists are still used as criteria, as, for example, by Willard (1957) and Davidson and Lang (1960).

Kowatrakul (1959) developed an instrument comprising six categories for studying student behaviors in the classroom. The categories are: (a) intent on ongoing work, (b) social-work oriented, (c) social-friendly, (d) momentary withdrawal, (e) intent on other academic work, and (f) intent on work in nonacademic area. These were used while the students were doing independent seatwork, watching or listening, or participating in a discussion. It was possible to identify and examine relationships between classroom activities, subject matter, and students' behaviors. The study was a modest attempt to specify, define, and quantify discrete behaviors in the classroom under certain stated conditions. By such little steps a formulation of a theory of education may eventually be reached that will help predict and control the variables of the educative process.

Kounin and Gump (1958) studied the behavior of kindergarten children as the latter watched their teacher disciplining or scolding a child for misbehavior. The researchers collected and analyzed 406 incidents and categorized the teachers' acts in terms of clarity, firmness, or roughness. A child's behavior as he watched the reprimand was listed as: (a) no reaction, (b) behavior disruption, (c) conformance, (d) nonconformance, or (e) both conformance and nonconformance. Within the framework of disciplinary procedures, it seemed that the ripple effect (impact of the teacher's disciplinary action on the watching child) is best controlled by clear instructions to the child being reprimanded. On the one hand, firmness or lack of it did not allow reliable prediction of how the watching child would react; on the other hand, roughness usually resulted in behavior disruption in the watching child. It is interesting to note that a phenomenon of which all have been aware (the effect on children of witnessing the public disciplining of a peer) has not been more closely examined. This and similar projects point to development of a sound theory of education.

Cogan (1956, 1958a, b), using perceptions and judgments of pupils as a criterion of effective teaching, deliberately rejected as criteria both pupil change and the more commonly (and easily) used evidence from in-service ratings and experts' opinions of the teacher's competence. He categorized teacher behaviors as preclusive, inclusive, and conjunctive, and assessed their effects on the learners. These effects were measured in terms of pupil performance of required and self-initiated work having to do with classroom activities. Cogan examined the logic and desirability of using pupil change as the major criterion of teacher effectiveness, but rejected it in favor of reports by the pupil of having carried out required schoolwork and self-initiated work arising from classroom experiences. This looks like a direct and common-sense way of assessing teacher effectiveness and of capitalizing on pupil judgments and perceptions which, to judge by earlier research, appear to have more reliability and validity than administrators' or supervisors' ratings.

Levin, Hilton, and Leiderman (1957) offered a survey of the main studies of the Harvard Teacher Education Research Project. They included a précis of Cogan's study and digests of the other studies, including an examination of authoritarianism in teaching, ego involvement in teaching, interests of teachers, bases for withdrawal from teaching, differences between elementary and secondary student teachers, and prediction of classroom behaviors of student teachers. They concluded with the understatement ". . . we have discovered that prediction of teacher behavior is a complex task with many questions which demand further investigation."

Rabinowitz and Rosenbaum (1958) assessed the predictive value of pupil-teacher rapport by certain standardized and some experimental instruments. The battery of instruments included the *Minnesota Teacher Attitude Inventory*, the *California I Scale*, the *Draw-a-Teacher Technique*, and the *Strong Vocational Interest Blank*. Seventeen measures comprising nine test scores, seven classroom observations, and one measure of pupil-teacher rapport were used. The researchers reported that the tests, singly or in combination with one another, failed to predict subsequent pupil-teacher rapport, and they concluded that they did not correlate with the objective measure of behavior in the classroom.

All the problems of research in this area are summed up and recorded by Ryans (1960) in an impressive, statistically comprehensive, and sophisticated manner. One of his findings confirmed the belief that teacher behavior in the classroom can be represented by three dichotomies which might be designated as friendly versus aloof, systematic versus unorganized, and imaginative versus uninspired. Results of the study derive, in the main, from use of two instruments, the *Classroom Observation Record* and the *Teacher Characteristics Schedule*. The former consists of 22 bipolarities, for example, apathetic versus alert, uncertain versus confident, partial versus fair. Eighteen of these opposites were used to rate teacher behaviors, and four were used to rate pupil behaviors. The 22 bipolarities were scaled on a seven-point scale in which the fourth

represented an average or neutral score. Observers noted specific behaviors by teachers and pupils and estimated the extent to which one or the other pole was approximated by the behavior of the teacher.

The other instrument, the *Teacher Characteristics Schedule*, comprises 300 multiple-choice and checklist items of teacher attitudes and viewpoints which seemed to correlate with teacher classroom behaviors as rated by the observers using the *Classroom Observation Record*. Ryans's summary points up the immensity of the task involved in devising ways of assessing and predicting teacher behaviors. Despite the more than 10 years of painstaking, thorough, and concentrated effort that this work represents, one is appalled at the fact that we have merely begun to nibble at the problem. This is made clear by the fact that the not inconsiderable findings of all the years of work by Ryans and his colleagues can be summarized on two pages (360 and 361) of his book. It is interesting to note that the lack of clear knowledge of the patterns of behavior of teachers cited by Ryans is being gradually eliminated by work such as that of Medley and Mitzel (1959) and Flanders (1960b).

At the University of Wisconsin in November 1960 four research projects on mental health in teacher education, supported by the National Institute of Mental Health, reported their efforts to describe and measure behavior patterns of both university instructors and public-school teachers in the classroom. Two working papers of the Wisconsin project, by Newell, Lewis, and Withall (1960) and Lewis, Withall, and Newell (1960) include statements on a 14-category instrument designed to describe teachers' behavior in terms of their asking for or giving information and directions to the learners and in terms of the negative and positive affects that accompany these interactions. Interjudge reliabilities (rank-order correlation coefficients) between two highly trained observers in three classrooms were 0.99, 0.97, and 0.98.

The University of Texas program concerned with mental health in teacher education developed recording operations in the instructional situation to describe classroom behaviors of the teacher and verbal and nonverbal behaviors of the students (Harris, 1960). Observers record in shorthand style all observable behaviors of students and teachers. Students' and instructors' oral responses are recorded verbatim. The record is transcribed to a running account as soon as possible after observation. Techniques used to analyze the typed transcripts in process of development include content analysis, categorization of specific units of content, interaction process analysis, and adaptation of case-study techniques.

The Bank Street College of Education project staff (1960) outlined the beginnings of a classroom observation procedure of their multifaceted study of the relationship of school experiences and personality development. Two recorders observe intensively for one hour and a half, and their records are combined to give the teacher's presentation and management techniques and the child's responses. The procedure aims to

reveal the two levels of social-psychological functions that appear in the classroom, the overt and the covert. This entails not only the planned, recognized, or relatively formal patterns of interaction in the classroom, but also the teacher's manner of indirectly structuring the children's orientation toward her, each other, and their work, by analyzing her differential allocation of rewards and punishments, goal-setting statements of various kinds, and evaluative comments.

The instrument-developing efforts of the Wisconsin, Bank Street, and Texas studies may help to extend our knowledge of teachers' patterns of behavior.

Bowers and Soar (1960) described an extended study of the human-relations skills needed by educators and the procedures that could be used in a three-week workshop to help teachers develop these skills. Working with 60 elementary-school teachers divided into control and experimental groups, they collected personality and attitude data, biographical data, and classroom observations by means of the *OScAR*. The teachers kept a log of their own activities. The question was raised of what impact the intensive workshop experience should have on teacher or pupil classroom behavior, and pertinent data were collected. In addition, analyses were made of the relationship of teacher behavior to teacher self-descriptions, the characteristics of teachers who use group activities, the correlates of effective group membership, and the relations between measures of teacher effectiveness. The significance of much of this research is its assessment of the effectiveness of laboratory training in human relations in changing the behavior of human beings, in this instance, teachers and pupils in the classroom situation.

Rippy (1960) reported a study of the relationships in the classroom between social-emotional climate, verbal emphasis, and social structure on the one hand, and, on the other, pupil skill in group planning and teacher attitudes and personality. He used Damrin's (1959) *Russell Sage Social Relations Test* and the *OScAR* of Medley and Mitzel (1958) for assessing human relations in the classroom. To assess attitudes and personality characteristics of the teachers, the *Bowers Teacher Opinion Inventory*, the *Minnesota Teacher Attitude Inventory*, the *Minnesota Multiphasic Personality Inventory*, and the *Survey of Educational Leadership Practices* were used. Fifty-four elementary-school teachers comprised the total population. Rippy's conclusions were that observing specific behaviors in the classroom afforded criteria of teacher effectiveness, that the way teachers described themselves was reflected both in the teachers' actual classroom behavior and in that of the pupils, and that teacher effectiveness is a multidimensional phenomenon.

Repeatedly in the literature of the last 30 years, brave words are encountered about the disappearance of the cleavage between cognitive and affective processes, the significance of personal-social needs and perceptions in the learning process, and trends toward reformulation of the problem of learning in a social-emotional context. Until recently these have

largely represented wishful thinking. Now there seems to be a modest ground swell of research activity within the context of the sociopsychological orientation along with a modest effort to identify the behavioral correlates of certain instructional procedures and resultants.

Conclusion

Two major trends influence researchers engaged in observation of classroom activities. One is reflected in the studies guided by the sociopsychological orientation set forth by Jensen (1960), Getzels and Thelen (1960), Gibb (1960), and Jenkins (1960). The other is seen in the attempt to define operationally the specific behaviors in which teachers and learners engage that can be hypothesized to relate significantly to group behaviors and individual learning. If these two trends merge, major advances in the control and prediction of learner and teacher activities are possible, as well as in the development of educational theory and ultimately the redirection of the teacher-education process.

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CHAPTER VII

Research Tools: Instrumentation in Educational Research

EDWARD B. FRY

EDUCATIONAL RESEARCH has long been dependent on the rating scale and the paper-and-pencil test. Current writings reveal that these tools are used over and over again, with a few exceptions in studies related to experimental psychology. Recently, however, attention has been drawn to new devices. Many of the new devices fall into a category commonly known as teaching machines.

Automated Learning Graph

Through the use of simple mechanical instrumentation, Keislar (1959) saw a learning curve develop. The instrument he used was a multiple-choice teaching machine, a converted "Navy Rater," which presented "pages" containing information about rectangles, followed by a multiple-choice question. The pupil responded to the question by pushing one of several buttons. If he pushed the correct button, a new "page" was presented; if he pushed a wrong button, nothing happened. An automatic recording device drew a graph. Perfect learning resulted in a vertical line, and errors made the pen move horizontally. Keislar's finding was that 14 fourth-grade and fifth-grade pupils using the instrument learned the material significantly better than the control group; however, the fact that the instrument can show exactly how the students learned at each step of the lesson and can graph the learning process automatically and instantaneously is more exciting.

With instrumentation of this type and other types described by Keislar, large amounts of data can be easily collected which will show learning plateaus, fatigue, weaknesses in presentation, effects of supplemental stimuli, and other variables.

Removal of Teacher Variable

One of the weaknesses in educational research has been the teacher variable—different teachers supplying enthusiasm or some other contaminant which makes the experiment difficult if not impossible to replicate. Instrumentation, to a large extent, can eliminate the teacher variable. For presenting lessons, instrumentation need not be complex. A tape recorder or motion picture can act as a standard instruction stimulus. A recent article on auditory abilities by a well-known reading specialist described the reading by teachers of paired words from standardized

tests. The amount of confusion which could enter with regional dialects is almost unbelievable; yet, as simple a thing as a phonograph record could give a standard stimulus. Luser, Stanton, and Doyle (1958) used recordings of 43 drill sessions in phonics to aid experimental groups. Evans, Glaser, and Homme (1960) developed a standard lesson to offer a control of that variable while other factors were varied.

Traditional Instrumentation

Educational researchers have been reluctant to adopt the established instrumentation of experimental psychology, but, with demand for more rigor, they will need and use more mechanical aids. As Grings (1954) states, ". . . specialized instrumentation . . . makes possible not only the extension of the range of senses but a reduction in the 'personal equation' of observation." He classifies instrumentation as (a) behavior recording systems (polygraph), (b) timing and counting (clock, electronic counter), (c) audition (audio oscillator), (d) vision (light meter, color plate), (e) other senses (anasthesiometer), (f) human learning and perception (memory drum, stereoscope), and (g) bioelectricity (electroencephalogram and galvanic skin response).

One ambitious doctoral candidate wired a teacher to a portable galvanic skin-response device and recorded her emotional reactions to the classroom (Goody, 1951).

An excellent and interesting review of devices and paraphernalia used in problem-solving research has been done by Ray (1955). He described multiple-choice apparatus, electromazes, water jar problems, coin weighing, the two-string problem, the cut pyramid, and problem boxes.

Discrimination

Discrimination training is common in the psychology laboratory but little used with direct relationship to education. Hively (1960) developed a teaching machine for simple discrimination which presented a stimulus picture and two choice pictures beneath glass plates; the child indicated his choice by touching a plate. Testing reading readiness of children from three to five and a half years old, he found that 15 of 27 subjects could learn simple discrimination; then, when the stimulus was gradually altered until matching was required, 4 out of 13 learned the matching task.

Hively's experiment was not a successful use of a teaching machine, but it points toward use of instrumentation in educational research. Use of the machine evolved a new contaminant, which the author described as "behavior which was shaped and maintained by accidental operation of the apparatus." Equipment manufacturers quickly saw a relationship between child-training and rat-training devices, and one company offers a mechanical dispenser for M & M's candies instead of food pellets.

Skinner's Disk Machine

Skinner (1958), a leader in the field of instrumentation for teaching and research, sought to increase the rate of learning. His disk machine presents information to be learned and asks for a response, usually in written form. The student writes a word or phrase on a tape that appears in a window. Then he activates a lever that brings the correct answer into view and, at the same time, moves his response under a glass portion of the window so that it cannot be changed. By moving the lever, the student indicates whether or not he judges his response correct; if it is incorrect, the item is presented again at the completion of the lesson.

Holland (1959) described an experiment in which 187 college sophomores used disk machines for 10 weeks in studying psychology. They worked through 1400 different frames in a median time of 14 hours. Though the experiment lacked rigorous control, 76 percent of the students said they felt the machine helped them in studying. Holland's experiment demonstrates that machines can be used in a teaching situation. Furthermore, an extremely important process, that of item analysis of student responses, was used. Heretofore, instructional materials (lectures, textbooks) have been developed almost solely by the armchair method. Machines are showing that it is possible to examine rigorously the presentation of curriculum material and find the exact point at which the student ceases to understand.

Some authors of teaching-machine programs have reported that the necessity of breaking the subject matter into the small units requiring responses revealed numerous gaps in established modes of presentation. An item analysis of machine responses positively shows these gaps. One model developed according to Skinner's principles by Rheem Caliphone Corporation includes a device which automatically tallies incorrect responses on the back of the tape. Thus the educational researcher simply needs to look at the back of the curriculum material to see where the errors occurred.

Complex Devices

One of the most elaborate devices designed for educational research is the Western Design Tutor (Western Design, 1960). It is an automatic random-access recording microfilm and motion-picture projector which contains 1000 or more motion-picture frames that can be presented in any order. By pushing a button on the control panel, the user sees a frame or a short segment of a motion-picture film. The type of instructional program usually put in this device is known as a "scrambled book"; a paragraph of material is followed by a multiple-choice question about it. The student responds to the multiple-choice question by turning to the page (in this instance, frame) numbered to correspond to the code num-

ber given by his answer choice. A scrambled book can be used without a machine, but with the scrambled book on film in the Western Design Tutor a complete record of the student's responses can be made, as well as of his latency. Since scrambled books can be written to permit the learner to be shunted through any one of several learning sequences (branching), depending on their apparent appropriateness, an automatic recording device for research is highly desirable.

Branching refers to the student's being sent, at certain points, on a remedial loop or back to an earlier point. Branching is usually involuntary on the part of the student and is determined by his errors. Other criteria, however, could be used for branching, such as latency of response or the student's conscious desire and indication that he wishes to review or speed up.

The SAKI (now known as Rheem Caliphone Corporation, DIDAK 1001) is a key-punch training device to train operators to punch cards by means of a 10-key keyboard similar to that of an adding machine. Its small circuit, similar to that of a computer, branches the rate of presentation according to the latency of the student's response.

Computers

Rath, Anderson, and Brainerd (1959) described an IBM 650 general-purpose digital computer with a typewriter input-output, which has been used for more elaborate branching based on individual differences in skill and rate. The computer also has a voluntary branching feature in which the student requests an easier program. It gives knowledge of results key by key; in other words, the student is informed of his mistake if he even types a wrong letter.

The use of computers has so interested some researchers that they have simulated computer experiments with human beings. Using a concealed human observer instead of a mass of electronic tubes, Coulson and Silberman (1960) investigated three teaching-machine variables—size of step, mode of response, and branching. Eighty junior-college students divided into eight groups were taught part of the Skinner-Holland psychology course. No significant difference was found in the mode of response, whether multiple-choice or constructed. Small-step items required more time but yielded significantly higher test scores than did large-step items on the constructed-response subtest. Branching conditions generally did not show a significant difference on the criterion test, except that they required less time when steps were skipped.

Investigating the same two response variables, multiple-choice and constructed items, Fry (1960) found that constructed-response items yielded significantly higher results than multiple-choice, when measured by a constructed-response post-test. Fry used a cardboard folder with a window slot to simulate a teaching machine. Both Coulson and Silberman

and Fry had difficulty with the multiple-choice section of the post-test, which failed to rate differences between the groups. Longer training or more complex material might have overcome this difficulty.

Continuing the same series of investigations by means of a Bendix G-15 computer, Silberman (1960) found preliminary results to indicate that effectiveness of teaching by machine is positively related to intelligence when only one trial is given of the material to be learned. Silberman's findings conflict with some of the statements from Harvard that hold that teaching-machine programs tend to obscure differences between bright and dull students.

All the devices so far discussed are for use by one student at a time. There have been several proposals for group use of computers. Ramo's (1957) conception of tomorrow's school smacks of science fiction: a computer to record a student's attendance by his thumb print, a computer to record his responses to instruction, results automatically recorded in a master memory file. The guidance counselor could at any time procure a complete record of the student's work by pushing a button.

Bushnell and Silber (1960) described Systems Development Corporation's proposed group-automated teaching device, to consist of a digital computer with magnetic-tape storage, alpha numeric printer, random-access light projector with back-projection screen, and individual desks equipped with student-response keyboards. In addition to giving knowledge of results to the student, the computer would analyze the behavior of the class to determine the selection of the material to be presented.

Language Laboratories

Language teaching by laboratory methods has been increasingly popular, in part as a result of the financial aid provided by the U.S. Office of Education and various foundations. The laboratory uses an auditory stimulus, such as a foreign language phrase, to be imitated and records the student's response on tape. The master control panel permits recording of any student's response for further analysis and research purposes. Motion pictures and slide projectors are also part of the mechanization of language teaching. The language laboratory is mainly rather an instructional than a research device; but Ramo (1957) conceived its use as an extension of psychological theory and related it to teaching machines, as did Morton (1960).

Guidance Devices

Guidance by slide projector and audio tape has proved useful in industrial situations. Irion and Briggs (1957) described the Hughes Aircraft "Video-Sonics" device, which is reported by Klass (1960) to have reduced employee errors on an electronics assembly line by 99 percent in 10

months and to have increased production from 60 percent of work standard to 90 percent. It tells the operator exactly which act to make, simultaneously showing him a picture of the act. It has implications for all manipulative training situations.

The effect of guidance, long known to be efficient in training situations, was further shown by use of the Subject-Matter Trainer, a multiple-choice machine also described by Irion and Briggs (1957), which presents an item to be matched with one of 20 answers. Primarily a research device, it can operate in a number of modes: for example, the student can be allowed to make only one error, or the student can be allowed to make any number of errors, and the machine will not proceed until the correct response is made. It proved most effective when the student read the question, pushed the button, and read the correct answer.

Simpler Teaching Devices

Not all devices are elaborate. Porter (1959) developed a write-in machine into which the pupil feeds by hand a sheet of duplicating paper. The paper is in a box so that the student cannot view it after it is fed into a roller. Activation of the roller exposes several lines at a time. The student reads the stimulus and writes an answer on the sheet. When the roller is activated, his response passes under glass, and at the same time the correct answer is shown. There are several varieties of simple write-in machines like this on the market.

Porter (1959) used his device for 22 weeks of the normal 34-week spelling program in grades 2 and 6. Standardized achievement tests showed the experimental group to be significantly superior to the control group. Porter found no relationship between intelligence scores and achievement in the experimental group, but a significant relationship in the control group. A check on the novelty factor was comparison of first-half performance scores with second-half performance scores; no difference was observed. Porter believed the experimental group spent only one-fourth as much time studying as did the control group.

Nonmachines

Use of teaching machines prompted some researchers to apply the same learning principles without mechanical aids. Homme and Glaser (1959) offered a method called a "Programmed Text," in which a stimulus item such as an incomplete statement is presented; the student responds on scratch paper, turns the page, and reads the answer. The pages have a special format of panels to save space.

Neither Eigen and Komoski (1960) nor Roe (1960) found significant differences in learning when identical material was presented by machines and programed texts.

A device which performs some of the functions of machine instruction is the tab-item, which requires the student to respond to a multiple-choice question by pulling a tab. Using this technique with 48 NROTC students, Bryan, Rigney, and Van Horn (1957) found that a student's knowing why an answer is incorrect is significantly more effective than his knowing simply that his answer is correct or incorrect.

Conclusion

Instrumentation has provided interesting vistas and pathways for the educational researcher, and also demonstrated that many of its principles can be used without the aid of mechanics. It is quite possible that, through research in instrumentation, educational researchers can significantly improve classroom instruction even if they conclude that instruments should not be used at all.

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CHAPTER VIII

Data Processing: Automation in Calculation

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AVAILABILITY of the electronic computer makes it possible currently to employ new methods in many areas of research. Performance of 1 million multiplications on a desk calculator is estimated to require about five years and to cost $25,000. On an early scientific computer, a million multiplications required eight minutes and cost (exclusive of programing and input preparation) about $10. With the recent LARC computer, 1 million multiplications require eight seconds and cost about 50 cents (Householder, 1956). Obviously it is imperative that researchers examine their methods in light of the abilities of the computer.

It should be noted that much of the information published on computers and their use has not appeared in educational or psychological literature but rather in publications specifically concerned with computers, mathematics, engineering, and business. The following selective survey is intended to guide the beginner into this broad and sometimes confusing area. It is not an exhaustive survey. It is presumed that the reader has access to the excellent Wrigley (1957) article; so the major purpose of this review is to note additions since 1957.

The following topics are discussed: equipment availability, knowledge needed to use computers, general references, programing the computer, numerical analysis, statistical techniques, operations research, and mechanization of thought processes.

Equipment Availability

As of December 1960, approximately 4000 stored-program electronic computers were in use in the United States. A wide variety of equipment is also available: desk-size engineering computers that plug into a wall outlet; many varieties of data processors with fast input, output, and access to large files of information; building-block machines whose configurations can be tailored to a variety of capacity requirements; the huge LARC of Remington Rand and IBM's STRETCH, machines that, pressing present technology to its limit, are capable of 1 million calculations per second. The use of solid-state elements, such as magnetic cores and transistors, has reduced the size and power requirements of the newer equipment and has markedly improved reliability.

Keenan (1960) presented the results of a survey of equipment, staff financing, and courses offered in connection with 100 university computing centers. The survey revealed that computers at colleges and universities

are already numerous and that soon almost any college will be able to obtain an obsolete but perfectly serviceable machine at little expense. In industry, most computers are used on a one-shift or two-shift basis, and it is not difficult to obtain machine time for research projects at nominal cost.

Although computers are available for the researcher, there is one vital shortage—trained people. Effective utilization of many computers is dependent on the ability of the researcher to use the machine himself. Thus it is important that the researcher be able to use the computer, for not only can he more easily make use of machines that are available, but he is also likely to obtain a better solution to his problem. More important, he is then equipped to use the computer to solve a larger and possibly more important problem.

Knowledge Needed To Use Computers

Several steps are necessary when a computer is used to solve a problem: (a) The problem must be defined in logical or mathematical terms. (b) This logical or mathematical formulation must be translated into an arithmetical procedure. (The translation from a mathematical statement into an arithmetical procedure is the subject matter of numerical analysis.) (c) An explicit series of instructions to the computer (the program) must be prepared to direct the computer through each step necessary to solve the problem. (d) The input data must be recorded in a form which the machine can read. (Readable media are punched cards, punched paper tape, and digital magnetic tape.) (e) Finally, the problem must be run—and the computer produces answers.

The following sections of this survey present information about these various steps. Frequently used mathematical and statistical models are presented in the sections titled "Statistical Techniques" and "Operations Research"; and a section titled "Numerical Analysis" is included. Techniques explained in the section titled "Programing the Computer" show how the researcher may use a machine without knowing all its technicalities. Punched-card input can be prepared by mark sensing or key punching, as described in the "General References" section. If many data are to be recorded from experimental equipment, it may be desirable to investigate the possibility of direct analogue-to-digital recording as discussed by Klein (1958) and Young (1960a).

General References

A number of excellent books about computers have been published recently. Andree (1958) discussed the programing of the IBM 650, and Wrubel (1959) used the IBM 650 as a vehicle to present techniques of

programing scientific problems. McCracken, Weiss, and Lee (1959) presented the programing of computers for data processing hypothetically. A comprehensive discussion of electronic data-processing machines and their use was presented in Gregory and Van Horn's (1960) book. Gille Associates (1961) compiled an equipment encyclopedia that describes various types of computers.

Sperry Rand (1959) produced *An Annotated Bibliography*. Among the periodicals of general interest not mentioned in Wrigley (1957) are *Computers and Automation*, *Control Engineering*, and *Datamation*. *Computers and Automation* periodically publishes a "Roster of Organizations in the Computer Field" and a "Who's Who in the Computer Field." Descriptive manuals are available from computer manufacturers, but most are written for reference purposes and are not easily read by the neophyte.

Programing the Computer

As in all problem solving, a precise statement of the factors and their mathematical or logical relations must first be prepared before the computer can be programed. With this statement, the researcher is ready to make the first move toward solution.

Program Library

If the solution of the problem requires use of a standard mathematical technique, the first step should always be a search for a program that may already be available to solve the problem with the computer to be used. Owing to the cost of writing computer programs, most manufacturers supply a number of basic programs and encourage the exchange of general-interest programs among their users. Many groups have organized for this exchange purpose, including SHARE (The Society To Help Avoid Repetitive Effort) for the IBM 704, 709, and 7090 computers; USE (UNIVAC Scientific Exchange) for the UNIVAC 1103A and 1105 computers; and CUE (Computer Users Exchange) for the Burroughs Datatron 220. Information regarding these organizations and their membership may be obtained from their secretaries.*

University computing centers also provide an excellent source of reference for library programs and have available some information on research in other universities. Many university computing centers distribute to other centers annual reports describing current research projects.

When deciding whether or not he can make use of a library program, the researcher must carefully examine the written description of the program to determine the following: (a) Does the program use the ap-

* The secretary for SHARE is Henry A. McCabe, Electronic Data Processing Department, Union Carbide Corporation, 270 Park Avenue, New York. The secretary for USE is J. W. Nikitas, 315 Park Avenue, South, New York. The secretary for CUE is Robert Gordon, Director of Data Processing, Stanford University, Stanford, California.

propriate mathematical method? Is the proper numerical technique used? (b) Are the characteristics of the problem at hand within the limitations imposed by the program? (For example, a program for finding the inverse of a matrix whose order does not exceed 30 cannot be used with a matrix of order 40.) (c) In what form must the information be presented to the computer? (d) Is the equipment configuration required by the program available on the machine? (e) Is the program available, along with a detailed description of its use?

When the program-library approach to the problem fails, the researcher must look to other methods. Early in the use of computers, it was realized that coding in machine language was difficult for the neophyte. In order to simplify this task, automatic programing techniques were developed which allow problems to be stated in a language which is more convenient for the researcher and which can be translated by the computer to prepare a program of machine instructions.

Interpretive Systems

Among the first approaches to automatic programing were the interpretive systems, in which the pseudo instructions of the programing language were stored in the memory of the computer, along with a program that translated these pseudo instructions into the proper sequence of machine instructions as the computer engaged in the process of solution.

The most widely known general-purpose interpretive system for the IBM 650 is "Bell Telephone Laboratories Interpretive Code," which has been described by Wolontis (1956), Andree (1958), and Wrubel (1959). Other systems were developed for special purposes, such as the University of Michigan "MITLAC" (1955), which included differential equation operations, and "SIS" (Haynam, 1957), which is designed for the solution of routine statistical problems. Frequently one of the existing interpretive systems will lend itself to the solution of the problem at hand; however, since time is required to perform the translation of each program run, this convenience must be paid for in terms of computer execution time.

Compiler Systems

A compiler is a translating program written for a particular computer which accepts a form of mathematical or logical statement as input and produces as output a machine-language program to obtain the results. Since the translation must be made only once, the time required to repeatedly run a program is less for a compiler than for an interpretive system. And since the full power of the computer can be devoted to the translating process, the compiler can use a language that closely resembles mathematics or English, whereas the interpretive languages must resemble

computer instructions. The first compiling program required about 20 man-years to create, but use of compilers is so widely accepted today that major computer manufacturers feel obligated to supply such a system with their new computers on installation.

Compilers, like the interpretive systems, reflect the needs of various types of users. For example, the IBM computers use "FORTRAN" (International Business Machines, 1957, 1958, 1959a) for scientific programing and "9 PAC" (International Business Machines, 1960c) and "Com Tran" (International Business Machines, 1960b) for commercial data processing; the Sperry Rand computers use "Math-Matic" (Sperry Rand, 1958b) for scientific programing and "Flow-Matic" (Sperry Rand, 1958a) for commercial data processing; Burroughs provides "FORTOCOM" (Turner and Waychoff, 1960) for scientific programing and "BLESSED 220" (Burroughs Corporation, 1960) for commercial data processing. There is some interest in the use of "COBOL" as a translation system common to all computers (International Business Machines, 1960a; Sperry Rand, 1960a, c; Radio Corporation of America, 1960).

Assembly Systems

Sometimes there is no recourse but to work in the computer's own language. This implies a good knowledge of the physical operations of the computer and their application to the problem at hand.

Assembly systems do not remove these requirements, but they make the task easier. They provide an easier form of expressing the operations to be performed upon the factors in memory. This is accomplished by a simple form of translating program which reads alphabetical abbreviations for the operations codes and symbolic names for memory locations and translates them into the numerical language of the computer. Usually there is a one-to-one correspondence between the steps of a symbolic program operated on by the assembler and the machine-language program it produces.

Assembly languages must conform to the design of the computer. The IBM manual for "SOAP II" (Symbolic Optimal Assembly Program written for the IBM 650 Magnetic Drum Computer) (International Business Machines, 1959b) presents an excellent example of the special nature of assembly systems. The needs for assembly systems are recognized by computer manufacturers and are considered a part of the tools supplied by them.

Numerical Analysis

Most of the groundwork for traditional numerical analysis was laid by Newton and his contemporaries in the eighteenth century. The early numerical techniques were developed by traditional mathematical methods. The advent of the modern computing machine precipitated a revolu-

tion in numerical methods, for the rapid acceptance of high-speed computers far exceeded the rate of development by traditional methods of the numerical techniques necessary. Accordingly, formal mathematical developments frequently gave way to hunches and modifications of proved methods, and much of the development in numerical analysis within the past 10 years came about as the result of modification and elaboration of traditional methods, with little concern for error analysis.

Research in numerical analysis today is chiefly concerned with rectifying its developmental shortcomings. Much of the research deals with error analysis and stability conditions of all types of numerical methods. The most complete and up-to-date information in this area is to be found in the professional journals. The major sources are *Computers and Automation*, *IRE Transactions on Electronic Computers*, *Journal of the Association of Computing Machinery*, and the *Journal of the Society for Industrial and Applied Mathematics*. Valuable articles also appear frequently in journals associated with fields in which computers are commonly used, such as physics, chemistry, astronomy, and psychology.

Today's textbooks in numerical methods concern themselves with specific areas, for example, Richtmyer's (1957) book on difference techniques in physical problems. Ralston and Wilf's (1960) text appears to be one of the few available in the general area of numerical analysis that is specifically concerned with modern computing techniques. The recent *Handbook of Automation* edited by Grabbe, Ramo, and Wooldridge (1959) provides an excellent reference for modern methods.

There has been much study of linear systems, and modern algebra saw much activity during the past three years. More than 130 computer programs involving linear algebra are available for the IBM 704, IBM 709, and IBM 7090. McKay (1957) described a special "Matrix Math Compiler" for the Remington Rand UNIVAC I. Faddeeva (1959) provided a valuable supplement to standard texts on linear algebra.

Statistical Techniques

Fortunately, computers have been in existence long enough so that many programs necessary for routine data reduction exist. A bibliography of statistical programs is beyond the scope of this review. The present purpose, therefore, is to inform the reader where such information can be obtained and to discuss the area generally.

Hamblen (1959) presented a compilation of abstracts of statistical programs for the IBM 650. He described 103 programs: 13 experimental-design, 35 correlation and multiple-regression, 6 factor-analysis, 7 curve-fitting and surface-fitting, 6 time-series and frequency-table, 10 nonparametric-statistics, and 26 random-numbers and miscellaneous. These are only a few, relatively, of the statistical programs available for one computer.

Michael (1959, 1960) edited a section of *Educational and Psychological Measurement* devoted to programing and procedures. In it Iker reported on computation by IBM 650 of group differences and means (1960a) and of item analysis using either a continuous (1960b) or a dichotomous criterion variable (1960c). Gaddis (1959) discussed questionnaire analysis. Kamman and others (1959) described a follow-up of work on test scoring by means of accounting machines. Madden (1959) used an IBM 709 for efficient test-battery analysis. Multivariate and a variety of factor-analysis applications were presented by Kaiser (1959, 1960) and by Horst, Dvorak, and Wright (1960).

The Statistical Laboratory of Case Institute of Technology began in the fall of 1960 to compile a "Bibliography of Statistical Computer Routines," which when completed should provide a useful tool for the researcher. Information on computer programs in this area frequently appears in professional journals such as *Psychometrika, Educational and Psychological Measurements, Journal of Experimental Psychology, Journal of the American Statistical Association,* and *Behavioral Science.*

Operations Research

Operations research is the application of the scientific method to management problems in organizations. Many ideas and techniques developed in the operations research literature may have value for educational researchers. An excellent bibliography of the field of operations research was prepared by the Case Institute of Technology Operations Research Group (1958). Among recent books on the subject are those by Churchman, Ackoff, and Arnoff (1957), Saaty (1959), and Sasieni, Yaspan, and Friedman (1959). Periodicals devoted to this subject include *Operations Research* and *Management Science.*

Linear programing is a mathematical technique for maximization or minimization of a linear function subject to a number of linear restrictions. Riley and Gass (1958) prepared a bibliography of linear programing. Among the many good books on the subject are those by Stockton (1960), Gass (1958), Ferguson and Sargent (1958), and Dorfman, Samuelson, and Solow (1958). Stockton's presentation is elementary and serviceable to those without mathematical background. Orchard-Hays (1958) described several computer programs for solving linear programing problems, and Shetty (1959) discussed the effect of changes or inaccuracies in the coefficients in a linear programing problem.

The theory of games concerns itself with conflict situations. Luce and Raiffa (1957) presented an excellent over-all survey of game theory and its significance in the social and behavioral sciences. Flood (1958) provided a game-theoretic discussion of several common conflict situations. Ellsberg (1956) gave an interesting critique of game theory.

Queuing (or waiting line) theory is concerned with problems in which

services are provided to *customers* who arrive in a random manner and wait in line to receive the service. The objective of the theory is to minimize the total of the cost of providing the service and the cost of customer waiting. Morse (1958) devoted a book to queuing theory and its applications, and Shelton (1960) presented a compilation of several formulas that have been developed for various types of queuing situations.

One of the most useful tools for the analysis of large and complex problems is simulation, by means of which a model of the situation under investigation is operated (usually by a computer) through succeeding intervals of time in order to evaluate performance under assumed conditions. Malcolm (1958) presented a number of examples of simulation and its use, and Martin (1959a) described several large simulation studies. A bibliography of simulation and its use was presented by Malcolm (1960). The industrial dynamics variety of simulation was discussed by Forrester (1958, 1959), and a simulation of the shoe industry was described by Cohen (1960). Enke (1958) described a large simulation in which human decision makers were integrated into a computer simulation in a situation too complicated to be handled by either the persons or the computer alone. Conway, Johnson, and Maxwell (1958) and the IBM's *Job Shop Simulation Application* (1960d) described general-purpose computer programs for simulation of job-shop dispatching operations. Davis (1959) discussed an automatic programing system designed for writing simulation programs.

A variation of the simulation technique called decision gaming (or management gaming, management decision simulation) was widely used for training and for research into various aspects of decision making. Several of these simulation exercises and their use were discussed by Bellman (1958), Martin (1959b), IBM's *Management Decision-Making Laboratory* (undated), and Sperry Rand's *Marketing Management Simulation* (1960b). The University of Kansas (1959) published the proceedings of a symposium devoted to discussion of various exercises of the same kind and the points of view of several people concerning their use. Guetzkow (1959) described experiments with the use of noncomputer simulation exercises in the area of international relations.

Mechanization of Thought Processes

A great deal of research effort is currently devoted to the possibility of the use of computers or the design of more advanced machines to perform in a manner that resembles the functioning of the human brain in certain respects. Much of this research has used the digital computer as an indispensable research tool. A National Physical Laboratory (1959) publication included a number of papers on this subject, and *Behavioral Science* reported a good deal of research. Young (1960a, b) and Uhr (1959) presented general surveys of the work in this field.

One basic approach is that of devising and (through computer simulation) testing theories of how the neurons of the brain interact with one another in thought processes. Reiss (1960) provided an excellent introduction to this approach. Another tack, the simulation of human methodological approaches to problem-solving activity, was taken by Gelernter and Rochester (1958); Newell, Shaw, and Simon (1958, 1959); Friedberg (1958); Simon and Newell (1958); and Hagensick (1960). Green (1960) reported on an automatic programing language devised to simplify research in this area.

The important problem of machine retrieval of information from (sometimes specialized) libraries has received much attention over the last few years. Vandenberg (1960) and Ledley and Lusted (1960) reported on the status of the use of computers for medical information retrieval and diagnosis. Similar projects in chemistry, law, and other fields were briefly reported in *Computers and Automation* (1960a). Discussions of some of the concepts involved in information retrieval may be found in Bourne and Engelbart (1958) and Luhn (1957).

Machine translation of languages was discussed by Blickstein (1960) and MacDonald (1960), and the outline of a recent conference was reported by *Computers and Automation* (1960b) in "National Symposium on Machine Translation." Coulson and Silberman (1960) described the use of a computer as a component of a sophisticated teaching machine.

Summary

This review has surveyed research on computers since Wrigley's 1957 article. During this period the number of computers in existence has increased to an extent that makes them available for research. Programing techniques have significantly advanced, and mechanisms have been established for the interchange of programs of general interest. Courses in programing for beginners are available to faculty members at most institutions that have computing centers.

Significant progress has been made in the use of computers in processing data, in computation, and in the non-numerical areas of simulation of intelligent behavior. It is certain that use of computers in educational research will increase greatly throughout the next several years.

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Index to Volume XXX

Page citations are made to single pages; these are often the beginning of a chapter, section, or running discussion dealing with the topic.

Abilities, intellectual: achievement of, as a goal of college, 323
Ability, student: relation to effectiveness of teaching methods, 356; relation to effectiveness of television instruction, 355
Ability grouping: and academic achievement, 265
Academic achievement: and participation in nonclass activities, 60
Academic freedom: reactions of faculty to concept of, 314
Academic success: prediction by intellective factors, 300
Academically talented: education of, 34; goals for educating, 31; instruction of, 49
Acceleration: programs of, 265
Accreditation, college: history of, 373; studies of, 373
Accreditation, National Commission of: development of, 386
Accreditation data: need for standardization of, 239
Accrediting agencies: activities of, 386; regional, policies and procedures of, 373
ACE Psychological Examination: and choice of college major in science, 143; institutional mean scores on, 313; Q-L differential and emotional problems, 142
Achievement: academic and social, in core curriculum, 234; and socioeconomic class, 291; in high school, and attendance at college, 289
Achievement-motivation measure: use with Korean veterans, 151
Achievement tests: use of, in college prediction, 300
Action research: description of, 53; evaluation of, as curriculum project, 232; reports on, 239
Adjustment: teacher criterion of, 248
Administration: of guidance services, 105
Administration and faculty relationships, college: study of, 374
Administrative procedures: degree of diffusion of, 212
Administrative structure: and curriculum development, 258, 269
Administrative theory: application to higher education, 387
Administrator: role of, in curriculum development, 258
Administrator and student: conflicts between, 315
Admission, college: procedure, and effect of counseling on, 171; studies of, 298; studies of, early, 344
Admission, selective: national pattern of, 290; procedures for study of, 301
Adolescence: subculture or developmental phase, 5; theories of, 23
Adolescent: increasing influence of peer groups, 207; influence of peers and adults on, 215; needed research on, 86; opinions, of, 17; plans, realism of, 18; problems of, 17; reference groups of, 5; society of, 5; textbooks on, 13; value patterns of, 24; values of, 17; vocational aspirations of, 18; vocational interests of, 18; voluntary associations of, 9
Adult education literature: guide to, 488
Adult roles: adolescent view of, 6
Advanced placement: of gifted students, 35; program, description of, 71; studies of, 298
Advanced placement examination program: description of, 234
Affect, level of: relation to client participation, 171
Affective behavior: relation to intelligence, 192
Agreement, coefficient of: for nominal scales, 459
Agriculture: factors influencing choice of, 152
Aims: of secondary education, 23
Algebra: co-ordination of, with analytic geometry, 40
Allport-Vernon Study of Values: use with guidance workers, 118
Alpha error: discussion of, 444
American history, study of: objectives of, 25
American Legion: textbook analysis and criticism and citizenship education, 201
Analysis of covariance: discussion of, 435
Analysis of variance: discussion of, 433; effects of assumptions in, 434; for factorial experiments, 432; noncentral variance ratios for, 433; nonparametric analogy of, 457; tests of hypotheses in, 434; theoretical and practical aspects of, 436
Anxiety: over grades, relation to teaching method, 251; reduction of, in teaching, 252; relation to effectiveness of methods of instruction, 356
Anxiety, experimentally induced: and learning, 499

Anxiety level: relation to competence in psychotherapists, 118
Application, skill of: as an outcome of independent study, 354
Applied research: in education, 413
Appraisal data: use of, by guidance and personnel workers, 141
Approximation methods, statistical: discussion of, 450
Aptitude tests: use of, in college predictions, 300
Arithmetic: comparison of European and American children in, 203
Articulation: of educational levels, 102; of educational program, 70; of educational programs, 342; of English curriculum, 235
Assembly-line guidance devices, industrial: discussion of, 517
Association: measures of, for cross-classification, 451
Associations, nongovernmental: list of publications of, 489
Assumptions, effects of violation of: in analysis of variance, 434; on *F* distribution, 435, 446; on *t* distribution, 443
Athletic honors: and future leadership, 18
Athletics, interscholastic: and scholastic attainment, 216
Attitude changes: from college freshman to senior, scale to measure, 328; effected by education, 217; effects of group procedures on, 163; resulting from group discussion, 351; of students in college, 326
Attitudes: of college student bodies, 291; of college students, 291; effect of college on students', 311; moral, in counseling, 99; relation of, in college students, to knowledge, 326
Audio-visual equipment: use of, 51
Audio-visual instruction: course of study in, 263
Authoritarian homes: and large families, 15
Authoritarian teaching: effect of, 251; studies of, 506; vs. democratic, 249
Authoritarian-equalitarian groups: among college students, 292
Authoritarianism: changes in college student in, 315; effect of college upon, 325; relation of effectiveness of methods of instruction to, 357; scale to measure, 328
Autocratic teaching method: study of, 352
Automated learning graph: discussion of, 513
Automatic teaching: research on, 252

Bartlett's method, generalization of: discussion of, 451
Basic research: in education, 413; utility of, 413
Behavior, observing and recording: discussion of, 496
Bibliographic resources: discussion of, in educational research, 487
Binominal distribution: discussion of, 453; table of probability levels for various size samples, 453
Binomial frequencies: test for the existence of an extreme frequency in, 453
Binormamin: development of, as factor analytic rotation system, 467
Biographical information: correlations with college grades, 303
Biographical inventory: use in college prediction, 305
Biological sciences: new curriculums in, 223, 236
Biquartimin: development of, as factor analytic rotation system, 466
Blind college students: vocational objectives of, 153
Block designs, incomplete: with analysis of covariance, 435; discussion of, 433; efficiency of the test statistic for, 436
Block plan of school organization: evaluation of, 232
Block-scheduling junior high: description of, 235
Book collections, special: guide to, 489
Brain, human: simulation of workings of, by computer, 529
"Brainwashing": studies of, 217
Branching: in teaching-machine programs, 516
Budget, long-term: as management tool in higher education, 393
Business education: curriculum in secondary schools, 37; studies of, 341, 376
Business students: characteristics of, 288

Calculation, automation of: discussion of, 522
California Psychological Inventory: and adolescents' self-reports, 16
California Test of Personality: and socioeconomic status, 144; stability of scores on, 330; use as criterion measure, 164
Canonical correlation coefficients: approximate distribution of, 459; asymptotic variances of, 459
Capacity of colleges: estimates of, 374
Career days: research on, 160; programs evaluation of, 173
Carnegie unit: discussion of, 70
Case study: of school in industrial city, 232
Causal analysis: discussion of, 423
Censored samples: estimation in, 446
Centers for study of higher education: establishment of, 237, 393
Centroid factor loadings: compared with quartimax rotation, 467

Cerebral-palsied children: effect of group discussion on mothers of, 162
Certificates: substandard, number of, 75
Certification requirements: of junior high-school principals, 73; of teachers, 75
Change, educational: problems of studying, 330
Character education: at college level, 291
Cheating, students' essays on: and college atmosphere, 316
Checklists: questionable validity of, 505
Chemistry: articulation of study in, 343; study of output of Ph.D.'s in, 379
Child-guidance clinics: development of, 208
Child-study programs: effect on teachers' ways of working with children, 261; in inservice programs, 261
Chi-square: as goodness-of-fit test, 452; Studentized smallest, use of, 453; use with small expected values, 452; use with small samples, 451
Choice behavior, individual: book on, 441
Church membership: increase in, as result of college, 364
Citizen co-operation: in curriculum development, 261
Citizen groups: use to recommend school policy, 202
Citizens Advisory Committee: discussion of, 232
Citizenship education: and American Legion, 201; through nonclass activities, 58
Class intervals: number and size of, in goodness-of-fit tests, 452
Class organization: discussion of, 49
Class size: and effect on achievement, 267; research on, 250; studies of, 351, 352; variance in, and effect on curriculum, 234
Classification: use of multinomial model in, 454
Classroom behavior: framework of concepts to analyze, 500; relation to authoritarianism in student teachers, 326
Classroom climate: as part of observation schedule, 504
Classroom, design of: for specific subject-matter areas, 263
Classroom interaction: operational definitions of, 503
Classroom observation schedule: development of, 506
Clearinghouses, information: information about, 490
Client: learning, personality influence on, 172; satisfaction, as criterion for evaluating counseling, 133, 173; self-learning, effect of personality on, 136
Client-centered therapy: current accounting of, 134; and the therapeutic relationship, 99
Climate, classroom: effect of, 216; as part of observation schedule, 504
Climate: college, study of, 312; high-school, and motivation to attend college, 315
Climate, intellectual, for research in universities: lack of, 411
Climatic variations: resultant child growth, 13
Cliques: formation of, 9
Closed-circuit television: use to disseminate occupational information, 154
Clothing: attitudes toward, 6
Cluster analysis: contrast with factor analysis, 469
College: outcomes of, 321
College academic success: effectiveness of intellective predictors of, 300; effectiveness of nonintellective predictors of, 302
College achievement: predictors of, 144
College admission: of borderline students, 240; studies of, 298
College attendance: expectancies of adolescents for, 18
College Characteristics Index: use to measure environmental press, 313
College education: student perceptions of, 323
College enrollment: accommodations by colleges of future increases in, 374; future projections of, 293; in nonbaccalaureate occupational curriculums, 338; regional differences in, 286; statistics of graduate, 341; study of desirability of increased, 377
College environment: dimensions of, 317; studies of, 311
College evaluation: review and analysis of problem of, 372
College finances: *see* Finances, college
College image: perception of, by students and parents, 315
College orientation program: effectiveness of, 161
College personnel services: studies of, 171
College preparation: high-school responsibility for, 30
College student body: homogeneity of, in attitudes, 327
College student subculture: studies of, 315
College students: background and characteristics of, 285; entering, diversity among, 325; types of, 316
College teachers: preparation of, 339
College teachers and teaching: bibliography on, 488
College teaching: reasons for attraction to, 315

Colleges: analysis of income and expenditures of, 60, 392; enrollment trends in, 287; interaction of institutional characteristics with student characteristics to affect achievement, 357; public vs. private, 287; ratings of, 375
Colleges and universities: co-ordination of, 386; evaluation of research needs in, 380
Communality estimation in factor analysis: discussion of, 463
Communication: as key in teacher-student relationships, 253
Communication theory: book on, 441
Communication, two-way: effect of, on learning via television, 354
Community colleges: characteristics of, 389; studies of, 389; training of technicians in, 337
Community-adolescent interaction: discussion of, 8
Competition: and student cheating, 316
Compiler systems for computers: discussion of, 525
Comprehensive high school: discussion of, 67, 233; strength of, 25; task of, 30
Computation: comparison of English and American students on, 204
Computational and graphic aids: discussion of, in regression analysis, 461
Computers, electronic: availability of, 522; discussion of, 522; discussion of compiler systems for, 525; discussion of interpretive systems for, 525; discussion of program assembly systems for, 526; discussion of program library for, 524; knowledge needed to use, 523; simulations on, 417; as teaching machines, 516
Conceptualization of educational process: discussion of, 409
Concordance: alternative measure of, 458
Confidence intervals: discussion of, 444
Conformity: effect of discipline on, 248; to group values, 24
Consensus studies: and aims of secondary education, 29
Constructed-response items: in teaching-machine programs, 516
Consultants, use of: in inservice education, 261
Content of education: determination of, 188
Contingency data, complex: analysis of, 451
Contingency tables: analysis of, 451; higher-order, analysis of, 451; measure of association in, 458
Control, experimental: in evaluation of complex programs, 365
Control-group method: use in evaluation of guidance programs, 172
Co-operative studies in higher education: description of, 378
Co-ordinated Education Center: discussion of, 229
Co-ordination, state-wide: of higher-education institutions, 386
Core curriculum: content of, 35; in junior high school, description of, 235; nature of, 38; organization of, 39; study of, 234; status of, 38; use of, 266, 267
Cornell University: history of state-supported colleges adjacent to, 386
Correlation: discussion of, 459
Correlation coefficients: unbiased estimates of in bivariate normal distribution, 459
Correlation coefficients, partial: related to tau, 458
Correlation, spuriously high: effect on common factor structure, 469
Correlational analysis: textbooks in, 441
Cost: of nonclass activities, 60
Counselee: evaluations of counseling process, 133; expectations of, in counseling, 133
Counseling: client choice of client-centered vs. eclectic, 133; counselor-client evaluation of, 172; definition of field, 131; effectiveness, client satisfaction as a measure of, 169; individual vs. multiple, 159; judging effectiveness of, 169; teen-agers' desire for, 6; theory, 132; value orientation in, 136; youths' desires in, 208
Counseling center: case study of, 173; student perceptions of, 171
Counseling orientation: classification of, 135; instrument to measure, 135; relation to specific techniques, 172
Counseling outcome: to personality structure of counselee, 134
Counseling process: determinants of, 132
Counseling profession: status of, 123
Counseling program: evaluation scales for, 172; in residence halls, evaluation of, 361
Counselor: certification of school, 125; desirable qualifications of, 116; duties and responsibilities of, 108; effects of personality on counseling outcomes, 134; effectiveness, evaluation of, 118; job analysis of, 135, 169; most important traits of, 362; perception of role, 109; salary of school, 125; selection techniques for, 119; subroles, analysis of, 117; supply and demand, 124; training of, 120
Counselor institutes: evaluation of, 122
Counselor training programs: inservice, effectiveness of, 173; rejection ratio, 116

Covariance: estimates with fallibility in the control variable, 461
Covariance, analysis of: disucssion of, 435
Covariance matrix: distribution of latent roots of, 459
Covarimin criterion: discussion of, 466
Cramér-Von Mises test: discussion of, 456
Creativity: in selection of researchers, 414; nature of, 218
Criterion problems: in college prediction studies, 306
Critical-incident technique: use in counselor-training evaluation, 122; use to differentiate effective and ineffective counselors, 135
Critical thinking: effect of large-group instruction on, 250; in junior high-school English curriculum, 235
Cultural transmission: through teaching, 253
Culture: impact of, on counseling, 132
Culture, student: study of, 215
Cumulative records: status and extent of, 108
Curiosity: as an outcome of independent study, 354
Curriculum: components of, 226; definition of, 185; effect of social and psychological research on, 214; forces influencing, 199; influence of changes in group life on, 211; influence of value changes on, 209; national, discussion of, 229; organization of, 240; proposal for, 190; scientists' influence on, 205; secondary, discussion of studies of, 233; state of the field, 185; teacher involvement in planning, 192
Curriculum changes: accompanying expansion of two-year to four-year colleges, 374
Curriculum decision making: institutional-instructional levels of, 189; at the societal level, 186
Curriculum development: administrative structure and processes in, 258; and inservice education, 259
Curriculum material: rigorous examination of, by teaching machines, 515
Curriculum organization: patterns of, 231
Curriculum problems in higher education: surveys of, 374
Curriculum, secondary-school: effect of college administrators on, 28; nature of, 34; organizational problems of, of large schools, 36; relation of nonclass activities to, 61
Curriculum study programs: relation between teacher satisfaction with, and method used to develop, 193
Curve fitting: discussion of, 462
Data-processing machines: discussion of, 522
Dating pattern: and family position, 16
Dean, college: predicament of, as an administrator, 388; role of, as faculty personnel officer, 388
Decision gaming: discussion of, 529
Decision making: as an aim of high school, 26; books on, 441; student, in nonclass activity, 59; use of the multinomial model in, 454
Decision theory: book on, 441
Definition, adequate: what constitutes, 427
Degrees conferred: annual list of, 393
Delinquency: increases in, 207, 208
Democracy: teaching of, by nonclass activities, 58
Democratic leadership: and productivity, 73
Democratic teaching: effect of, 251; vs. authoritarian, 249
Democratically acting principals: and readiness for curriculum change, 259
Demonstration lesson: as inservice training, 260
Demonstration of small objects: via television, 354
Dental students: characteristics of, 289
Depersonalization: general social trends toward, 209
Desegregation: pressures on curriculum, 200
Design of experiments: discussion of, 430
Developmental research: in education, 413
Developmental tasks: as basis for planning kindergarten room, 262; research on, 18
Dewey, John: and conceptualization of learning process, 497; publications during centennial, 187
Dictionary of Education: reference to, 488
Difference scores: problem of using, in growth studies, 330
Differential Aptitude Tests: and counselor effectiveness, 118; and prediction of achievement, 144
Differential prediction and admission at college level: studies of, 307
Directions: effect of clarity of, on discipline, 248
Directories: of educational institutes and organizations, 489
Disciplinary programs, student: nature of, 364; preventative and remedial, 365
Discipline: dimensions of, 248; effect on other children, 505
Discovery activities: direction of, and effectiveness of learning, 250
Discovery, logic of: discussion of, 428
Discovery method of teaching: studies of, 250

Discriminant function: replacement by simultaneous regression equations, 461; use of method in evaluative studies of counseling, 169
Discrimination training: by teaching machine, 514
Discussion: effect of its combination with television instruction, 355; vs. lecture, studies of, 351
Discussion methods: comparison with other teaching methods, 250; dimensions of, 352
Discussion, small-group: as used in Pyramid Plan for teaching, 352
Discussion techniques: effects of, on group decision, 503
Dissertations, doctoral: compilation of, 487
Distribution function: approximating values of, by another distribution, 450
Distributive education: programs in, 39
Doctoral degree: factors tending to prolong completion of, 340
Doctoral programs and requirements: compilation of, 340
Doctoral students: production of in natural science, and directiveness of teaching, 353; undergraduate college origins of, 288
Documentation centers: information about, 490
Drama: facilities for, 263
Drop-out rate: effect of guidance services on, 170
Drop-outs: factors contributing to, 16; and nonclass activities, 60; prediction of high-school, among females, 144
Drop-outs, college: causes of, 322; rate of, in relation to various factors, 321
Dual-progress plan: description of, 265

Early admission to college: studies of, 344
Ecology of colleges: studies of, 311
Economic education: scope and sequence charts in, 262
Economic philosophy: application to problems of the scientific age, 206
Economic subsidies: effect of, on supply of counselors, 125
Economics of higher education: discussion of, 390
Economics of research: relation to education, 410
Education: guides to access to literature of, 488
Education, foreign: aids to study of, 489
Educational associations, in many countries: information about, 489
Educational change: conditions for, 23
Educational objectives: classification of, 26, 27; determiners of, 28; of nonclass activities, 58
Educational philosophy, city-wide: statements about, 262
Educational research: amount desirable, 412; appropriate distribution of activity in, 413; efforts toward increasing, 410; guides to, 488; lack of effort toward, in colleges and universities, 411; nature of, 411; not keeping pace with world, 410; recent developments in, 415
Educational research workers: training of, 414
Edwards' *Personal Preference Schedule*: independence of subscores, 144; use in college prediction, 305; use with rehabilitation counselor trainees, 117
Efficiency of a statistical test: theoretical papers on, 456
Ego defenses: relation to attitudes, 217
Ego involvement in teaching: studies of, 506
Elective choices: of able students in high school, 26
Elementary education: curriculum decisions in, 230
Elementary school: articulation with secondary, 70; group counseling procedures for, 164; guidance services, 107; nongraded, discussion of, 231; perception of, by public, 231
Elementary-school teachers: training in liberal arts, 239
Emotionally disturbed: and counseling, 132; interests and occupational choices of, 143; theories of vocational choices of, 149
Empathy: relation to aesthetic sensitivity, 135
Empirical viewpoint: as applied to guidance, 98
Employee attitudes: research on, 148
Employment, college student: effects of, on achievement, 363
Employment conditions: of secondary-school teachers, 76
Engineering: accrediting problems of, 373; curriculums and general education, 334; education, study of, 341, 376
English, classroom for teaching: need of, 263
English curriculum: in core classes, 235; high-school, changes in, 235
English fundamentals: teaching by television, 323
English instruction: goals of, 29
Enrichment, inclass: utilization of, 265
Environment, college: studies of, 311
Error components, correlated: analysis of variance for, 434
Estimation: relation to hypothesis testing, 447
Estimation of points: discussion of, 446

Estimation with censored samples: discussion of, 446
Estimation with order statistics: discussion of, 447
Ethical judgment, rational foundation for: discussion of, 423
Ethics, professional: of the counselor, 125
Ethnic environments: effect on personality, 15
Ethnocentrism: effect of college upon, 292, 325
European and American children: comparison in arithmetic, 203
Evaluation: of guidance and personnel services, 168; of learning, trends in, 52; of nonclass activities, 63; problems of, in studying colleges, 371; of teacher success, 78; as topic in philosophy of science, 422; of training for guidance and personnel workers, 121
Evaluation of education: pre- and post-Sputnik, 203
Evening-college students: performance in liberal-arts courses, 335
Evidence: discussion of, in context of philosophy of science, 426
Example-setting: effects of, 248
Expenditure per pupil: and quality of education, 212
Expenses, student: rise of, 390
Experiment, single-factor: linear and quadratic effects in, 432
Experimental design: discussion of, 430; textbooks in, 441
Experiments: moral issues in, 422
Experiments with repeated measurements: discussion of, 431
Explanation: discussion of, in philosophy of science, 424
Extracurricular activities: discussion of, 57

F distribution: effect of non-normality of population on, 435, 446; effect of skewness on, 435
Factor analysis: communality estimation in, 463; computational procedures, 469; discussion of, 463; more appropriate techniques than, 470; rotation methods in, 466
Factorial experiments: discussion of, 431; multiplicative model for, 433
Factors from factor analysis: comparison across studies, 468; number extracted, and relation to communality problem, 464
Faculty: real income of, 390; shortage of, at college level, 390
Faculty-administration relationships, college: study of, 374
Faculty morale: and excellence in higher education, 378
Faculty personnel policies: of 11 state universities, 388; study of, 374
Faculty of professional schools: views regarding liberal education, 377
Faculty subculture, college: studies of, 314
Faculty support: of nonclass activities, 61
Family interaction patterns: and mental illness, 217
Family life, changes in: influence on curriculum, 209
Family-life courses: usefulness of, 210
Family norms: importance of, 6
Family relationships: of adolescents, 7, 14
Father-daughter relationship: investigation of, 7
Federal aid to education: history of struggle over, 200
Federal departments' education programs: study of, 340
Federal sponsorship of research: questions related to, 341, 391
Feedback: properties of, 461
Fellowships, graduate: information on, 363; national survey of, 341
Feminine identity: and lack of commitment to intellectual goals, 328
Fiducial intervals: distinguished from confidence intervals, 444
Field trips: effectiveness of, in occupational choice, 161
Field services vs. research: allocation of resources, 411
Finances, college: analysis of, in 60 institutions, 392; effect on accreditation, 373
Financial aid, college student: studies of, 363
Financing of higher education: controversy over, 390; effort of states in, 391; private support of, 392; studies of, 390
Finite populations: estimating the mean of, 446; sampling of, 445
Fiscal controls, state level: and efficient institutional management, 386
Fisher's *z* conversion: substitute for, 463
Fisher-Yates index: discussion of, 458
Food-services facilities, college: studies of, 362
Foreign educational practices: impact on American education, 202
Foreign students: educational programs for, 365; follow-up of college training of, 365
Foreign study: enrollment trends in, 289
Foreigners, education of: bibliography of studies of, 490
Foundations, philanthropic: activities of, 226; origins, policies and roles of, 392

Fraternity: acceptance of university administration after group discussion, 164; as an influential reference group, 312; effects of, 362
Funds: management of nonclass, 59

Gains, measurement of: in evaluation, 378
Galvanic skin response: as measure of anxiety, 499; to measure teacher reactions in classroom, 514
Game theory: book on, 441; discussion of, 528
General Aptitude Test Battery: and counselor effectiveness, 118
General education: acceptance of, by students, 375; achievement of objectives of, 335; bibliographies on, 336; college undergraduate programs of, 237; effect on student interests, 329; goals of, in secondary education, 25; at high-school level, 235; important developments in, 374; science courses, growth of, 36; in technical curriculums, 388; training of instructors for, 336
General Educational Development Test: analysis of, 144; comparison of, with other mental ability tests, 144
Geography curriculum: description of, 237; new approaches to, 193
Gifted: education of, 34; goals for educating, 31; instruction of, 49, 52; provision for, 264, 265; views of, on growing up, 6
Gifted student, college level: and college attendance, 289; and study habits, 325; studies of, 292
Goals of education: perception by students and faculty, 291
Goals of secondary education: comprehensive list of, 25; discussion of, 23
Goal-setting: observation of, in teaching, 508
Goodenough Draw-a-Man Test: and Indian youth, 14
Goodness-of-fit: tests of, 452, 456
Governing boards of colleges and universities: study of, 388
Government: relationship to higher education, 385
Grades: effect of anxiety over, 251; effect of removal of, 231; relation of average level of to teacher-pupil rapport, 249; relation to student status and roles, 215
Grading, co-operative: compared with competitive, 352
Graduate education: studies of, 339; studies of, as a national resource, 340
Graduate programs: in guidance and personnel work, 119
Graduate schools: enrollment trends in, 288
Graduate students: distribution among subject-matter fields, 288
Graduate training: effect of federal support of, on quality, 391; seniors' plans for, 288
Graduates, college: nature of, determined by initial selection, 372; proportion of, to initial enrollees, 321
Graduation requirements, high-school: of states, 36
Group-automated teaching device: discussion of, 517
Group-centered classes: effectiveness of, 502
Group counseling: research on, 159
Group life: influence of changes in, on curriculum, 211
Group planning, pupil skill in: relation to other classroom variables, 508
Group procedures: use of, in guidance work, 158
Group psychotherapy: in counselor education, 119; research in, 164; use of, 252
Grouping: effects of flexible plan, 264; heterogeneous vs. homogeneous, 264
Grouping, ability: effects of, 49
Groups, observing and recording behavior of: discussion of, 496
Growth: of adolescents, 13; technical problems of studying, 330
Guidance: definition of, 102; differentiated from counseling, 131; in elementary grades, 153; in nonclass activities, 60; philosophical foundations of, 97; relationship to education, 101; role of classroom teacher in, 110; theoretical framework of, 100, 132
Guidance and occupational literature: compilations of, 489
Guidance and personnel services: evaluation of, 168; studies of college, 171
Guidance directors: functions of, 106
Guidance office: relation to administrative office, 108
Guidance workers: duties of, 117; sources of, 116; supply and demand, 124

Health, physical education, and recreation: bibliographies of reports on research in, 488
Health services, college: studies of, 363
Heredity and environment: influence on vocational choice, 148
Heterogeneity: statistical tests of, 448
High-ability college students: studies of, 292
Higher education: controversy over student financial support of, 390; curriculum decisions in, 237; economics of, 390; general criticism of, 379; history of administrative aspect of, 386; reference works on, 392

High-school grade record: methods for increasing its correlation with college grade record, 302; use of, in predicting college success, 301
History: of accreditation, 373; of administrative aspects of higher education, 386
History of science: teaching of, to understand the scientific age, 206
Homeostasis: properties of, 461
Homogeneity: statistical tests of, 448
Homogeneous grouping: relation to gain in achievement of authoritarian in, 357
Hotelling's T^2: alternative to, 449; expressions for the moments of, 459
Housing: of junior high schools, 68
Housing, college: studies of, 361
Human-relations skills needed by educators: study of, 508
Human resources: and financing of higher education, 393
Hypothesis testing: discussion of statistics for, 447

Ideal students: faculty and student conceptions of, 315
Images of college: by students and parents, 315
Imagination: nature of, 218
Impulse control: types of college students', 327
Impulses, readiness to express: scale to measure, 328
Independent samples: tests for comparing, 456
Independent study: accomplished through project method of teaching, 353; results of use of, 353, 356
Indexing: punch cards for, 491
Indexing, co-ordinate: system of, 491
Information: achievement of, as a goal of college, 323
Information-giving, by teacher: instrument to assess, 507
Information retrieval: by machine scanning, 490
Information theory: as basis for test of independence, 451; book on, 441
Inservice counselor training: evaluation of, 122, 173
Inservice education: and curriculum development, 259; discussion of, 269; problem areas for study, effects of, 261; techniques of, 259
Institutional atmosphere: studies of, 311
Institutional productivity: relation to *College Characteristics Index*, 314
Institutional research: bibliography of, in graduate and professional education, 340; findings from a program of, 378
Institutions: description of characteristics of, 316; educational, evaluations of, 371; and relation to personal needs, 317
Instruction: improvement of, 351; of large groups, 250
Instructional materials: equitable staff use of, 259; evaluation and selection of, 263; methods of distribution of, 263; preparation for use of, 263
Instructional materials center: suggestions for, 263
Instructional procedures: research on, 246; in secondary school, 49
Instructors: differential effectiveness of, with various teaching methods, 357
Instrumentation: classifications of, 514; in educational research, 513
Integration: of educational experiences, 52; of general or liberal education, 335
Integrative teacher behavior: effect on children, 498
Intellective predictors of college academic success: effectiveness of, 300
Intellectual abilities: achievement of, as a goal of college, 323
Intellectual ability: and college attendance, 289; of students, selectivity of colleges in, 290
Intellectual component: increased emphasis on, in high school, 30
Intelligence: and behavior control, 14; growth of, 14; of Indian youth, 14; relation to effectiveness of teaching by machine, 517; relation to effectiveness of teaching methods, 356; relation to social power, 502
Intelligence tests, group: use in college prediction, 300
Intelligence vs. achievement: and teaching by teaching machines, 518
Interaction process analysis: assessment of, 507
Intercultural experience: effect on attitudes, 17
Intercultural patterns: curriculum and instructional implications of, 201
Interest inventories: educational, 119; employment in prediction studies, 143
Interests: stability of, with knowledge of aptitude, 142
Interests of college students: change in pattern during college, 329; modification by general education, 329; relation of change in, to likelihood of graduation, 321
Interests of teachers: studies of, 506
International education: bibliographies of, 490
International relations: computer simulation exercises in, 529
Internships: fifth-year programs, 238
Interpretive systems for computers: discussion of, 525
Interval estimation: discussion of, 444; in the binomial model, 453

Interview: as technique of counseling agency, 234; teacher-student, effect of an achievement, 232
Interviewing groups: as instrument in selection of counselors, 119
Intramural sports program: based on student need, 92
Inventory of adjustment and values: as criterion of effect of group discussion, 163
Inventory of Beliefs: institutional characteristics and score changes on, 312, relation to other college student characteristics, 325
Iowa Tests of Basic Skills: use to compare Dutch and American children, 204
Item analysis: electronic computer method for, 528

Job satisfaction: research on, 148
Journalism education: study of, 341, study of ratio of professional to liberal-arts content, 376
Junior colleges: case study, 317, characteristics of, as branch of state university vs. state junior college, 389; enrollment in, 286; public, yearbook on, 390; studies of, 389; studies of transfer students in, 342; training of technicians in, 337
Junior-college expansion to four-year: curriculum changes accompanying, 374; prevalence of, 374
Junior high school: effectiveness of orientation program in, 161, housing of, 68; organization and staff of, 68
Juvenile delinquency: as a subculture, 8
Juvenile delinquents: attitudes toward legal authorities, 6; curriculum organization for, 35

Kendall's tau: discussion of, 458
Kendall's *W:* alternative measure of, 458
Kerr-Speroff Empathy Test: use with rehabilitation counselor trainees, 117
Kindergarten: advantages of, 264
Kindergarten-primary program, integrated: experimentation with, 231
Kindergarten room: developmental tasks as a basis for planning, 262
Knowledge, sociology of: discussion of, 428
Kolmogorov-Smirnov test: discussion of, 456
Kruskal-Wallace test: improved beta approximation to, 457
Kuder Preference Record: effect on self-evaluation of interests, 170; interpretation of, 142; use on college science majors, 143; use with guidance workers, 118; use to predict success in vocational school, 143

Academic Aptitude Test: and measures of social power, 402

Laboratory instruction: experimental method of, 255
Language: alternatives, formation of, 417
Language study: views on, 22
Language teaching: Committee of Ten on, 20; new pattern of, 266; in Newton Plan, 254
Large schools: advantages and disadvantages of, 212
Latent class analysis: determinant methods for, 430
Latent profile analysis: comparison with other methods, 430
Latent structure analysis: comparison with other methods, 430
Latin square: discussion of, 430; missing or mixed-up observations in, 432; optimality properties of, 426; for repeated measurements experiments, 431
Law education: study of, 341
Law students: comparison with medical students, 313
Lay cooperation: in curriculum development, 261
Laymen: influence of, on secondary education, 28
Leaderless role-playing: effectiveness of, compared with leaderless group discussion, 163
Leadership: in curriculum development, 258
Leadership in student activities: in relation to student-body size, 362
Leadership techniques: of principals, 73
Leadership-training course: effects of free group discussion in, 163
Learner-centeredness: instrument to assess, 499
Learning: and behavioral goals, 218; effect of direction in, 250; evaluation of, 52; guidance of, 50; laws of, applied in classroom, 52
Learning curve: development of, with instrumentation, 513
Learning functions: mathematical models of, 416
Learning or growth parameters: estimation of, 433
Learning, theory of: implications for teaching machines, 252
Learning and thinking processes: mechanized or programed models of, 416
Lecture method vs. project method: study of, 249
Lecture vs. discussion: studies of, 52, 351
Legal problems: of health service, 363
Legal status and role: of different levels of college hierarchy, 389
Liberal arts: in teacher education, 238

Liberal-arts colleges: enrollment in, 286; history of, 336; nondenominational, and authoritarianism, 316; private organization and operation of, 388
Liberal-arts curriculum: professional content in, 377; for technical and professional students, 237
Liberal education: bibliographies on, 336; effects of, as personified by faculty's student nominees, 328; studies of, 334; studies of aims and methods of, 341
Library resources: for educational research, 487
Library-science education: studies of, 341
Life Experience Inventory: use in college prediction, 305
Limits: place of, in counseling, 132
Linear algebra: programs for computers using, 527
Linear models, general: estimation procedures in, 434
Linear programing: in operations research, 528; techniques for regression analysis, 463
Linear-regression equation: discussion of, 462
Literature retrieval: by machine, 490
Literature searches, mechanical: discussion of, 490
Literature, world: in junior high-school curriculum, 235
Loans, student: importance of, 290; information on, 363
Local control: of curriculum, 190; of education, 240
Logic: and views of teaching, 252
Logical analysis: application to social-science concepts, 428
Longitudinal study: evaluation of guidance services, 168; of college students, 292, 327, 329
Low-ability students: effect of a large class on, 250

Magazines: reports on education in, 488
Maladjusted children: and domineering father, 15
Manifest Anxiety Scale: use in college prediction, 304
Mann-Whitney *U* statistic: extension of and tables for, 455; study of, 456
Marriages, teen-age: studies of, 7, 209
Married students: housing of, 361
Mass media: in relation to teaching process, 213
Matched samples: tests for use with, 457
Matching: vs. randomization in studies of counseling, 168
Matching groups designs: and analysis of covariance, 435
Mathematical models: in economics, management science, and psychology, 416; in educational research, 416
Mathematics: continuity in curriculum of, 343; education in foreign countries, bibliography on, 490; high-school enrollment in, 37; high-school programs in, 40; improvement of instruction in, 205; instruction, improvement of, 70; modern, book on, 442; new curriculums in, 227, 236; summer program in, 344
Matrix inversion: used in analysis of correlational data, 462
Means, ranking of, for two normal populations, variances unknown: methods of, 448
Mean-square contingency, coefficients of: probabilistic interpretations of, 451
Measurement and scaling, theory of: books on, 441
Measurement, scale of: and use of nonparametric methods, 455
Median: confidence intervals for, 455
Medical curriculum, new: report on, 239
Medical education: sociology of, 313; studies of, 341
Medical school: general education as prerequisite, 335
Medical students: characteristics of, 288
Mental development: of adolescents, 14
Mental health: and the school program, 210; curriculum materials for teaching, 211; effect of instruction in high school on, 50
Mental-hygiene procedures: in group settings with school-age children, 164
Mental measurements: reference guide to, 488
Merit pay: discussion of, 77
Metabolic rate: and growth rate, 13
"Methods courses": near-obliteration of, 238; timing of, 239
Miller Analogies Test: and counselor effectiveness, 118; use with rehabilitation counselor trainees, 117
Minnesota Multiphasic Personality Inventory: characteristics of college dropouts on, 322; comparison of college seniors with freshmen on, 329; comparison of scores of college students and parents on, 143; and counselor effectiveness, 118; and early marriage, 7; relation to other variables, 249; scores of delinquent vs. nondelinquent boys on, 141; in study of classroom variables, 508; use in college prediction, 304; use with rehabilitation counselor trainees, 117
Minnesota Teacher Attitude Inventory: relation to classroom behavior in student teachers, 326; relation to other variables, 249; in study of classroom variables, 508; use to study teacher-pupil rapport, 506; use with student teachers, 239
Minority groups: authoritarian attitudes of, 315

Misbehavior: causes of, 248; relation to punishment used, 248
Mobility: effects on school turnover, 209
Model building, mathematical and mechanical: applications to educational research, 415
Monteith College: program of, 238
Mooney Problem Check List: and early marriages, 7; as criterion of effectiveness of college orientation course, 161
Moral issues: in experimentation, 422
Morale: assessment of faculty, 378; discussion of staff, 77
Mother-daughter relationship: investigation of, 7
Mothers: effect of television on attitudes toward children, 162; effect on sons' reading growth, 162
Mothers' employment: effects on children, 210
Motion pictures: effectiveness of, in reducing frustration, 164; use in teaching physics, 51
Motivation: discussion of, 218; questioned as explanatory construct, 218; relation to changes in IQ, 324; of student, and teaching methods, 250; by teacher comments on tests, 250; theory of, 49
Moving averages: graphical approach to calculation of, 462
Multi-age plan: use of, 264
Multi-grade plan: experimentation with, 231; use of, 264
Multinomial distribution: discussion of, 453
Multiple-choice items: in teaching-machine programs, 516
Multiple correlation: coefficients, confidence intervals for, 460; easy method of computation, 462; graphical method of solution, 462; use of, in college prediction, 301
Multiple counseling: research on, 158
Multiple-criterion approach: use to analyze instruction, 496
Multivariate analysis: estimates of parameters in, 459; textbooks in, 441; use to study counselee-counselor interaction, 136
Multivariate confidence bounds: estimation of, 460
Multivariate two-sample problem: nonparametric randomization tests of, 458
Music: facilities for, 263; objectives of, 25

National Commission on Accreditation: development of, 386
National curriculum: discussion of, 229
National Defense Education Act: and guidance services, 105; recognition of counselor education, 123
Need for achievement: relation to preference for independent study, 356
Negro college students: success in Northern colleges, 302
Negro college women: occupational choices of, 151
Negro employment: changes in, 153
Neuromuscular organisms: mechanized model of, 416
Nomographs: discussion of, 450
Noncentral t distribution: approximation of, 450
Noncentral variance ratios: use in analysis of variance, 433
Nonclass activities: cost of, 60; discussion of, 57
Nondirective teaching: effects of, 352; relation of prevalence in college to production of doctoral students, 353
Nongraded elementary-school plan: discussion of, 231; use of, 264
Nonintellective predictors of college academic success: effectiveness of, 302
Nonintellectual characteristics of students: college selectivity in, 290
Nonlinear models: discussion of, 432
Non-normal populations: effect on t-test, 443
Non-normality: effects on F distributions, 435
Non-null cases in theory testing: discussion of, 442
Nonparametric statistics: developments in, 455; textbooks in, 441
Nonparametric techniques in experimental design: discussion of, 435
Nonparametric tests: generalized efficiency measure for, 456
Normal distribution: table of frequencies of, relative to selected class intervals and sample sizes, 450
Normative data, institutional: need for, in evaluation, 372
Normit analysis: tables for estimating normal distribution, 450
Novelty factor: in teaching-machine learning, 518
Numerical analysis: discussion of, 526
Nursing education: balance of professional and general-education content in, 376; eradication of dichotomy between liberal and professional studies, 335; in junior and community colleges, 337; refinement of programs in, 239

Obesity: causes of, 14
Objectives: of secondary education, 23; sources of, 23
Objectives, curriculum: discussion of, 230; of secondary education, 233; usefulness of, 191
Objectives, institution's: use in its evaluation, 372
Observation, classroom: focal points for, 253

Observation schedule, teacher: development of, 504, 506
Occupational aspiration: of adolescents, 18; determinants of, 150; relation to social status, 290; and socioeconomic class, 10, 17
Occupational classification: research on, 149
Occupational course: description of, 153; research on, 160
Occupational information: materials, uses of, 153; research on, 148; sources of, 152
Occupational mobility: of persons of different racial extraction, 149
Occupational roles: of women, 151
Occupations: social status of, 150
One-tail vs. two-tail tests: discussion of, 449
Operations research: discussion of, 415, 528
Order statistics: discussion of, 447
Organization: of guidance services, 105; of secondary school, 34, 67
Organization, school: and curriculum, 234; research in, 212
Orientation: of new teachers, 76
Orientation activities; and effectiveness of college, 161
Orientation to college: programs for, 364
Overachievement: as college career type, 313; and study habits, 314
Overpermissiveness: effects of, in child rearing, 207

Paired comparison: test for bias in, 457
Parameters, estimation of: maximum likelihood methods for, 446
Parametric statistics: developments in, 442
Parent-teacher-pupil conference: evaluation of, 232
Parents: attitude of adolescents toward, 6; group procedures with, 162, 164; relationship to adolescents, 7, 15
Partial correlation: coefficients, related to tau, 458; easy method of computation of, 462
Participation: limits on, in nonclass activities, 60; in nonclass activities, 60
Path analysis: treatment of, 461
Patriotism: school emphasis on, 24
Pattern of response: designs for investigating values of, 432
Pay: extra, for extra work of teachers, 62
Peer culture: as a factor in students' college experience, 316; effect on college students, 328; influences on, in learning situation, 502
Peer groups: effect on feminine role, 6
Peer ratings: of social characteristics and teacher-pupil rapport, 249
Peer relations: adolescent, 8
Perception: of adult society by adolescents, 6
Perception of student behavior, teacher's: accuracy of, and teacher's effectiveness, 248
Perceptions of college: by students and parents, 315
Perceptions, student: as evaluative device for college student personnel services, 366
Perceptron: description of, 416
Permissiveness, classroom: relation to achievement, 503
Persistence: of changes in students, 329
Personal development courses: use of group guidance in, 163
Personality: changes in, by college experiences, 303, 324; relationship of, to scholastic aptitude, 142
Personality characteristics of college student bodies: studies of, 292
Personality development: relation to school experiences, 507
Personality functioning: relation to college achievement, 327
Personality pattern: of effective counselor, 117
Personality tests: status of research on, 143
Personnel policies, faculty: and excellence in higher education, 378; survey of, in higher education, 374
Phenomenological theory: and the therapeutic relationship, 99
Philosophy: of guidance, 97
Philosophy of science: discussion of, in educational research, 422
Phonics: recordings for drill sessions in, 514
Physical acceleration: and psychological adjustment, 15
Physical development: of adolescents, 13
Physical facilities: and the curriculum, 262; relation to educational program, 268
Physical retardation: and psychological adjustment, 15
Physical sciences: new curriculums in, 228, 236
Physically handicapped: special facilities for, in colleges, 364
Physics: college-preparatory, 41; improvement of instruction in, 205; teaching, by film, 51
Physiology: as part of biological sciences curriculums, 236
Placement records: value of, 153
Placement service, college: studies of, 363
Point estimation: discussion of, 446
Poisson distribution: confidence interval estimation in, 454; discussion of, 453;

estimation of parameters in, for truncated, conditional, and modified distributions, 454
Political and educational philosophy, Soviet: ideological sources of, 203
Power of a statistical test: theoretical papers on, 456
Power structure: of classroom, 502
Practicum training: use in guidance and personnel training, 120
Precollege guidance clinic: effectiveness of, 172
Precollege testing and counseling program: evaluation of, 171
Precounseling orientation: effectiveness of, on client readiness, 162
Prediction: of teaching success, 247
Premedical education: effect of liberal-arts content in, 377
Preparation: of guidance workers, 115
President, university: comments on job of, 388; prime responsibility of, 387
Pressure group: effect on curriculum, 200
Principal: role of, in curriculum development, 258, 268; of secondary school, 72
Probability-density functions: optimal weighting function for smoothing of, 462
Problem-solving activity: simulation of methodological approaches to, 530
Problem-solving arithmetic: comparison of English and American students, 204
Problems inventory: factor analysis of, 16
Proctors: effect of, on television instruction, 355
Profession: characteristics of faculty oriented toward, 314
Professional education: studies of, 339; surveys of, 341, 376; tendency to become liberal, 335
Professional schools: enrollment trends in, 288; increase in women's enrollment in, 287
Professional status: relation to role of research, 409
Professionalization: of guidance and personnel workers, 115, 123; of secondary-school principalship, 72; of teachers, 75
Professions, accrediting agencies for: activities of, 386
Profile analysis problem: analysis of variance for, 434
Programing, computer: automatic, 525; discussion of, 523, 524
"Programmed Text": discussion of, 518
Programs, educational: evaluation of, 371
Progressive Matrices Test: and Indian youth, 14
Project-centered teaching: results of, 353; vs. lecture method, 249
Proportions: comparison of methods for estimating, 454
Psychiatric approach: use on students and their problems, 293
Psychiatry: application to problems of the scientific age, 206
Psychiatry students: characteristics of, 289
Psychoanalytic theory: relation to teaching, 252
Psychological journals: list of, 489
Psychological services, college: survey of research in, 364
Psychology: use of teaching machines in teaching of, 515
Psychology, dictionary of: reference to, 489
Psychology of occupations: research on, 148
Psychology reference books: list of, 489
Puberty: and mother-daughter tension, 7
Public administration education: studies of, 341
Public opinion: survey of, regarding school's tasks, 231
Pupil judgments: as criterion of effective teaching, 506
Pupil problems: effect of teacher knowledge on, 111
Pupil-teacher load: in Dutch schools vs. American, 204
Pupil-teacher rapport: predictive value of, 506
Puppet-play technique: use to reduce frustration in children, 164
Purposes of education: determination of, 188
Pyramid Plan of teaching: study of, 352

Quality: dimensions of, in college, 371
Quantitative methods: textbooks in, 441
Quartimin: development of, as factor analytic rotation system, 466
Questionnaire: analysis of, by electronic computer, 528; as technique of accrediting agency, 374
Queuing theory: discussion of, 528

Racial groups: effectiveness of group discussion on attitude toward, 163
Radex theory: empirical evidence of, 469
Radio: impact on adolescents, 5
Randomization theory: discussion of, 430
Randomized blocks: discussion of, 430; exact nonparametric model of, 457; nonparametric procedures for, 435
Randomness: statistical tests of, 457
Range, restriction of: effect on prediction, 301
Rank-order statistics: theoretical papers on, 455
Rapport: relation to personality indices, 249
Ratings: questionable validity of, 505
Reading clinics, college: studies of, 364

Reading instruction, developmental: in junior high school, 235
Reading levels: grouping by, use of, 264
Reading readiness: and simple discrimination, 514
Reference group: of adolescents, 5; influences on student, 315
Reference works: on education, guides to, 488; general, guide to, 487
Referral resources: counselor acquaintance with and utilization of, 108
Reflective thinking: as aim of high school, 26
Regents of the University of the State of New York: history of, 386
Regression: discussion of, 459
Regression analysis: aids to reducing computation in, 461; and prediction, discussion of, 460; to select limited number of predictor variables, 461
Regression coefficients, higher order: method of computing, 462
Regression equation, linear, fitting of: discussion of, 462
Rehabilitation counselors: training of, 121
Relationships, learned through guided self-discovery: retention of, 354
Religion: in the college educative process, 363
Religious beliefs: persistence of, after college graduation, 329
Religious elements: in general education, 336
Religious-emphasis research: effect of, 364
Religious orientation: relation to counseling, 99
Replication of investigations: plans for full and fractional, 431
Research: as major occupation of doctoral graduates, 339; bibliographies of, 490; federal support of, 341; fostering of, in small college, 380; role of, in education, 409; source of standards of, 412; unresolved questions related to federal sponsorship of, in university, 391
Research and development process: relation to educational research, 412
Research-assistantship support: national survey of, 341
Research bureaus and institutes: directory of, 489
Research literature of education: access to, 487
Researcher, educational: training program for, 414
Residence halls: construction of, 361; studies of counseling programs in, 361
Response surface methodology: discussion of, 432
Responsibility, acceptance of: in self-directed class, 352; relation to achievement, 356
Retention of factual material: learned through independent study, 353
Retrieval of information: by electronic computer, 530
Rewards and punishments: observation of, in teaching, 508
Rho, Spearman's: discussion of, 458
Rigidity: and value of independent study, 356
"Ripple effect": control of, 505
Role, feminine: development of, 6
Role expectations: of counselors, 117; relation to institutional goals, 317
Role of child in classroom: variables influencing, 501
Role perceptions: of school administrators, 148; of school counselor by others, 109
Role-playing, leaderless: compared with leaderless group discussion, 164
Role, superintendent's: perception by self and others, 191
Role-taking processes: of teacher, 248
Role, teacher's: discussion of, 253
Rorschach: use in college prediction, 304
Rotation in factor analysis: discussion of, 466
Rural-urban residence: and student aspirations, 290
Rural youth: and social values, 18
Russell Sage Social Relations Test: discussion of, 501; use in classroom experiment, 508

SAKI: discussion of, 516
Salary: average, of secondary-school staff, 76; differences in relation to sex, 77
Sample size: and width of confidence interval, 445; as function of cost of sampling and erroneous decision, 453
Sampling, double: discussion of, 445
Sampling procedures: discussion of, 445
Scaling, psychological: books on, 441
Scheduling, flexible: experiments in, 50
Scholarly productivity of colleges: and personality characteristics of students, 292; relation of index of, to attraction of gifted applicants, 313
Scholarship winners: personality characteristics of, 292
Scholarships: importance of, 290; information on, 363
Scholastic aptitude: and college attendance, 289; and personality, 142
School boards: authority to assign teachers to nonclass activities, 62
School counselors: certification of, 125; salary of, 125
School library: as a general materials center, 263
School organization: research in, 212
School size: and availability of curriculum offerings, 36; effect on activities pro-

gram, 36; optimum for senior high school, 69; and quality of education, 212
School structure and organization: and curriculum, 264
School year: lengthening of, 29
Science: bibliography of programs in foreign countries, 490; evaluation of current programs in, 236; high-school enrollment in, 37; high-school programs in, 41; place of, in curriculum, 205
Science courses: articulation among, 343
Science, philosophy of: in educational research, 422
Scientists: influence on curriculum, 205
Scolding: effect on other children, 505
Scrambled book: discussion of, 516
Secondary education: curriculum decisions in, 233
Secondary school: curriculum of, 34; enrollments in, 36; nonclass experiences in, 57; organization of, 34; organization and staff of, 67; program for noncollege youth, 29; role of, 67
Secondary-school teachers: training of, in liberal arts, 239
Selection: of college applicants, studies of, 298; of guidance workers, 115; processes of, of administrator, 72
Self, concern for: by teachers, 249
Self-acceptance: change in, of underachievers with counseling, 159
Self-accepting attitudes: and Negro-white attitudes, 18
Self-appraisal: course for prospective guidance workers, 119
Self-directed class: comparison with conventional, 352
Self-concept: and vocational choice, 100
Self-discipline: as a part of adjustment, 101
Self-knowledge: increased by counseling, 134
Self-perception: discrepancy with ideal self, effect of group discussion upon, 163
Self-ratings: increase in accuracy of, with counseling, 159; stability of, 171
Self-studies, college: findings on, 377; as part of accreditation process, 374; of specific universities, 340
Semantic differential: relation to teacher's verbal behavior, 249
Semiprofessional education: studies of, 336
Senior class, college: synthesizing courses in, 335
Senior high schools: organization and staff of, 69
Sensitivity of similar experiments: comparison of, by noncentral variance ratios, 449
Sequential-estimation procedure: for confidence intervals, 444
Sequential experimentation: discussion of, 433
Sequential sampling: discussion of, 445; to get optimal unbiased estimation, 453
Sequential test for mean: tables for, 450
Sequential treatment of subjects: experimental design for, 431
Serial correlation: discussion of, 460
Sex differences: in college enrollment, 287; in salary of secondary-school teachers, 77
Sex role: relation to academic orientation of female college students, 328
Sibling similarity: in intelligence and achievement, 14
Sign test: efficiency of, 449; extension of, to k-variate distributions, 457; with matched samples, 457; multivariate, development of, 457; tables for, 457
Signed-rank test: with matched samples, 457; related to equivalence of Wilcoxon's test, 457
Significance tests: nonparametric, new ones and modifications of existing ones, 456; power of, discussion of, 443
Simplified-runs test: discussion of, 458
Simulation: discussion of, 529; discussion of, in relation to educational research, 417
Size of college: effect on accreditation, 373
Skewness: effect on F-test, 435
Skilled worker: training of, 336
Slow-learning pupils: effect of separate classes on, 34
Slum living: impact upon children, 232
Small samples: use of with chi-square, 451
Small schools: advantages and disadvantages of, 212
Social attitudes: of adolescents, 17
Social change: as a task of secondary education, 24
Social climate: permissive, relation to achievement, 503
Social cohesion: as an aim of general education, 25
Social-distance scale: use in group formation study, 9
Social and emotional adjustment: of adolescents, 15
Social-emotional climate: classroom, measure of, 504; permissive, effect of, 216; relation to other classroom variables, 508
Social objectives of education: criticism of, by scientists, 205
Social perception: of children, 230
Social power and intelligence: interrelationship of, 502
Social problem-solving behavior: investigation of, 192

Social psychology: application to teaching, 250; use in analysis of teaching, 498
Social roles: of college faculty, 314
Social science general education: curriculum in, 194
Social status: defined by participation in high-school nonclass activities, 60
Social status of occupations: relation to income, 150
Social structure, classroom: assessment of, in observation, 504; relation to other classroom variables, 508
Social studies: controversial issues in, 202; curriculum in core classes, 235; new curriculums in, 228; objectives of, 25; planning of teaching facilities for, 263; units of study, effectiveness of, 251
Social system: school as, study of, 215
Social-work education: studies of, 341
Socialization: as principal effect of college education, 326
Sociempathy: and status in a group, 9
Societal conditions: as curriculum determinants, 24
Socioeconomic status: and academic aptitude, 144; and adolescent group membership, 10; and attitudes toward segregation, 200; and behavior of adolescent, 16; and *California Test of Personality*, 144; and child rearing studies, 214; and college attendance, 290; of college teachers, 315; relation to interest-inventory scores, 143; relation to occupation, 150; relation to other variables in school, 214; upper, values reinforced by school, 9
Sociology: application to problems of the scientific age, 206; effect on curriculum of research in, 214; of medical education, 313; of occupations, 149
Sociometric pattern: of ability groups, 265
Sociometric status: relation to intelligence, 248; relation to various factors, 17
Sociometrically structured groups: attitude change in, 163
Somatotype ratings: of adolescents, 13
Sororities, college: effects of, 362
Spearman's rho: discussion of, 458
Specialization, change in field of: and likelihood of graduation, 321
Specialized education: nature of, 25
Split-plot design: discussion of, 430
Sports: interscholastic, balanced with formal curriculum, 61
Stability: of changes in students, 329
Staff: of secondary school, 67
Staff utilization: discussion of, 266; in secondary school, 71
State-supported colleges and universities: co-ordination of, 386; fiscal control of, 385; history of, adjacent to Cornell University, 386
State-wide surveys: of higher education, 374, 386
Statistical computer routines: abstracts of, 527; bibliography of, 528
Statistical inference: discussion of, 442
Statistical methods: discussion of, 440
Statistical textbooks: discussion of, 440
Statistics, theoretical: papers on, 442
Status of children, classroom: variables influencing, 501
Status persons: characteristics of, 9
Step, size of: in teaching-machine programs, 516
Stratified sampling: discussion of, 445
Strong Vocational Interest Blank: stability of profiles, 143; use in pupil-teacher rapport study, 506; use with rehabilitation counselor trainees, 117
Student activities: discussion of, 57
Student behaviors, classroom: instrument for studying, 505
Student-centered teaching: vs. teacher-centered, 249
Student characteristics: relation to effective teaching, 356
Student councils: discussion of, 59
Student culture: effect on college students, 328; study of, 215
Student employment, college: studies of, 363
Student handbook: characteristics of, 111
Student mortality and survival: studies of, 321
Student personnel services: evaluation of, 365; college, evaluation of, 366
Student problem areas in college: priority test of, 362
Student subculture, college: studies of, 315
Student teachers: differences between elementary and secondary, 506; prediction of classroom behaviors of, 506; relation of classroom behavior of, to authoritarianism, 326
Student teaching: planned experiences prior to, 239
Student union: educational role of, 362
Study activity: as a predictor of college success, 305
Study of Values: relation of teachers' verbal behavior to, 248
Study-skills course, college: study of, 364
Styles of teaching: research on, 249
Subversive activities, investigation of: and voluntary censorship by teachers, 201
Summer-school programs: studies of, 344
Superintendent: role expectations of major reference groups, 191; role perception of, by self and others, 191
Supervised study: effectiveness of, 52

Supervisor, curriculum: responsibilities of, 259
Supervisory roles: in curriculum development, 258
Surveys, state-wide: of higher education, 374, 386

t distribution: conditions under which it approximates normal curve, 450; effect on, of violation of assumptions, 443
t-test: efficiency of, 449
Tab-item test: as instructional device, 519
Tables, statistical: list of, 450
Tail-area probabilities: discussion of use of, 443
Tau, Kendall's: discussion of, 458
Teacher: functions of, 252; as guidance worker, 110; in inservice training program development, 261; permissive, characteristics of, 314; role of, and student-teacher relationship, 249
Teacher aids: and curriculum, 234
Teacher assistants: in driver education, 72
Teacher behavior: instrument to assess, 507; representation of, in instrument, 506
Teacher-centered classes: effectiveness of, 502
Teacher-centered teaching: instrument to assess degree of, 499; vs. student-centered, 249
Teacher characteristics schedule: development of, 506
Teacher comments: effect of, on tests, 248
Teacher-counselors: comparison with guidance specialists, 121; effects of, 173
Teacher education: guidelines for, 202
Teacher effectiveness: and classroom observation measures, 504; criteria of, 247; critical-incident approach to measure of, 499; pupil-change as criterion of, 506; pupil judgments as measure of, 506; ratings of, relation to class size, 250; relation of, to verbal control, 498; relations between measures of, 508; specific behaviors as criterion of, 508; with various testing methods, 357
Teacher influence: assessment of, 498
Teacher involvement in curriculum planning, 192
Teacher load: formulas for, 77; nonclass activities as part of, 62
Teacher personnel policies: improvement of, 72
Teacher preparation: general-education aspects of, 335
Teacher-pupil information exchange: assessment of effect of, 507
Teacher-pupil rapport: and grade averages, 249; of first-year teachers, prediction of, 249; relation to personality indices, 249
Teacher-pupil relationships: characteristics of effective, 50; research on, 246, 247
Teacher roles: conflicts in, 503
Teacher self-descriptions: and characteristics of teachers who use group activities, 508
Teachers: beginning, orientation of, 76; beginning, problems and deficiencies of, 76; differential effectiveness of, with various instructional methods, 357; dismissed, characteristics of, 78; dropouts, reasons for, 75, 78; effective, qualities of, 78; supply of, in secondary school, 74; training of, for general-education instruction, 336
Teachers colleges: comparison of liberal-arts training in, with liberal-arts colleges, 239; enrollment in, 286
Teachers' handbooks: preparation of, 262
Teaching: assessment of, 253; attitude toward, of adolescents, 18; concepts of, 251; conceptual structure for, 247; definition of, 217, 253; effectiveness of, 247; improvement of, 335; logic of, 191; logical structure of, 253; principles of, from principles of learning, 252; psychotherapeutic view of, 252; research on, 246; study of quality of, 377; styles of, 249, 500; successful prediction of, 247; theoretical structure of, 248
Teaching assistantships: national survey of, 341
Teaching machines: comparison with programed texts, 518; complex machines, 515; discussion of, 252, 513; effect of, 214; multiple-choice, 513; studies of, 355; use of computer as, 530
Teaching methods: eclectic, superiority of, 217; nontraditional, discussion of, 238
Teaching teams: use of, 238
Team-intern teaching: school appropriately designed for, 263
Team teaching: discussion of, 72; effect of, 51; experiment in, 50
Teamwork class: comparison with lecture, 352
Technical education: bibliography on, 490; problems of, 338; studies of, 336
Technical institutes: study of, 389; training of technicians in, 337
Technical schools: enrollment in, 286; increase in women's enrollment in, 287
Technicians: preparation of, 389; ratio of, to engineers, need to increase, 336
Technological forces: effect on curriculum, 202
Television: closed-circuit, advantages of, 71; credit courses, offerings in, 213; effect on achievement of attention to, 355; effect of combination with instruction, 355; effectiveness of, 213; excessive viewing of, behavioral concomitants

of, 213; influence of, on social studies, 231; instruction, and class size, 267; stations, network of educational, 51; teaching by, results of, 323, 354; use of, to supplement instruction, 50; use of, to change mothers' attitudes toward their children, 162; use of, in teaching, to demonstrate small objects, 354
Terminal programs: decrease in, with shift from two- to four-year college, 375; study of, 389
Terminal student, latent: "cooling-out process" for, 389
Test data: methods to assist interpretation of, 111; use and interpretation of, 141
Test selection: comparison of various methods of, 142
Testing, knowledge of results of: relation to learning, 355
Tests: effects of teacher comments on, 248; use of, for selection of counselor trainees, 116
Tests of Basic Skills: use to compare Dutch and American children, 204
Tests of hypotheses: in analysis of variance, 434
Texts on research: annotated list for several countries, 490
Thematic Apperception Test: and the adolescent girl, 15; and parent-child relationships, 7
Theological education: studies of, 341
Theological orientation: as integrating principle in general education, 335
Theological schools: increase in women's enrollment in, 287
Theories, abstract, development of: discussion of, 425
Theory of knowledge: and views of teaching, 252
Therapeutic communities: discussion of, 211
Therapy: relationship to teaching, 252
Theses on education authored outside the U.S.: list of, 490
Thought processes, mechanization of: discussion of, 529
Time budgeting: learning of, 59
Time series: estimation of autoregressive parameters from, 460; graphical approach to calculation of, 462
Tolerance for ambiguity: relation to counselor's effectiveness in communication, 118, 135
Traffic-flow planning: simulation model of, 417
Transfer of training: relation to learning method used, 250
Transfer students: studies of, 342
Translation of languages, by machine: discussion of, 491, 530
Training: of counselors, 120; of guidance workers, 115; evaluation of, for guidance and personnel workers, 121
Treatment pairs: method for comparison of, 436
Trend hypotheses: statistical tests of, 455
Truncated distributions: and estimation of the mean, 449
Truncated samples: estimation from, 447
Trustees, college: and curriculum decisions, 194; and curriculum improvement, 240
Tuition: using contribution of, to college finance, 390
Turnover, school: correlates of, 209
Tutorial group: study of, as teaching method, 352
Type I error: discussion of, 444; relation to one- vs. two-tail test, 449
Two-year college: studies of, 389

Underachievement: as a college career type, 313; and study habits, 314
Underachievers: effect of counseling on, 159; effect of individual- and multiple-counseling on, 159
Underinvestment in education: effects of, 413
Ungraded school: examination of, from viewport of architect, 262; use of, 231, 264
Union, student: educational role of, 362
Unit concept, in social studies teaching: effectiveness of, 251
Universities: enrollment in, 286; ratings of, 375; as social organisms, 387; training of technicians in, 337
University presses: directory of, 489
U.S.S.R.: ideological sources of political and educational philosophy of, 203
Utilitarian ethic: discussion of, 423

Value judgments, objectification of: by philosophy of science, 423
Value patterns: of adolescents, 24
Values: of adolescents, 17; changing of student's, in schools, 215; effects of, on curriculum, 209; relation of teacher's value pattern to student's, 248; role of, in counseling, 99, 136; variations within social class, 214
Values of college students: changes in, 291, 311, 326, 334
Variance as a variable: designs for investigation of, 433
Variance, components of: discussion of, 434
Variances: new nonparametric test for comparing, 456
Variances, equality of: test of more than two, 448
Variances, set of: test whether smallest variance is less than designated variance, 453

Varimax criterion in factor analysis: discussion of, 466
Verbal behavior of teacher: influenced by his value patterns, 248
Verbal learnings: assessment of, in classroom observation, 504
Viewing group, size of: a variable in television instruction, 355
Vocational-agriculture teachers: guidance work of, 121
Vocational aspirations: of adolescents, 18
Vocational choice: research on, 151; suitability of, resulting from different counseling treatments, 161
Vocational choices: parents' prediction of, 18
Vocational counseling: shift from, 173
Vocational development: theory of, 100, 148
Vocational education: aims of, 26; bibliography on, 490
Vocational interests: of adolescents, 18
Vocationally handicapped: and counseling, 132

Wages of a lifetime: relation to length of time in school, 153
Wechsler Adult Intelligence Scale: and Indian youth, 14
Wherry-Winer method of factor analysis: discussion of, 469
Wilcoxon signed-rank procedure: extension of, 456; ways for handling zeros and ties, 457
Withdrawal from teaching: studies of, 506
Women: changing role of, in work world, 210; occupational role of, 151; post-college plans of, 363
Women's colleges: changes in students observed in, 329
Workbook drill: comparison with other instructional methods, 355
Workshop: as preferred method of in-service education, 260
Writing, theme: teaching by television, 323

Youth, alienation from general culture: impact on education, 207
Youth culture: nature of, 5

Zatocoding: reference to, 491

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